THE CITY OF CALGARY TRAFFIC CALMING POLICY

THE CITY OF CALGARY

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The City of Calgary
Traffic Calming Policy

A policy report prepared by

Urban Systems Limited

for

Planning and Transportation Policy
Land Use and Mobility
of
The City of Calgary

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This document has been developed in consultation with the following participants:

- Members of City Council
- Community Association Representatives throughout Calgary
- The Federation of Calgary Communities
- Staff from the operating divisions of The City of Calgary
- Interested individuals

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TRAFFIC CALMING POLICY

KEY MESSAGES

Traffic calming is an effective approach to address existing traffic issues on residential and low volume collector roads. This Traffic Calming Policy provides clear direction on the types of traffic calming measures to be considered in Calgary, and appropriate circumstances for their use. Refer to Table 4.1 for a summary of traffic calming measures. Traffic calming measures are usually appropriate for area wide traffic issues such as short cutting. 'Other Issues,' identified in Section 3.2 do not generally warrant traffic calming measures.

There are currently over 230 communities in Calgary and limited staff resources to investigate traffic issues, complete traffic studies and implement trial and permanent traffic calming measures. This report identifies a process for responding to traffic issues so that communities with the most severe traffic issues will be dealt with on a priority basis.

Section 3.3, 'Community Initiatives,' highlights some of the resources available to help individuals and community groups address their own traffic issues. Some of the initiatives include a speeding awareness program, portable educational signs, trip reduction programs and plain language publications that address frequently asked traffic questions. One of the most cost-effective approaches to address traffic concerns is the reduction or elimination of auto trips. The City's website - www.calgary.ca - has extensive information on alternative forms of transportation including; walking, cycling, transit, flexible work arrangements, carpooling and working from home. We encourage individuals to promote these transportation alternatives at home, at work and in the greater community.

Much of the information contained in the Traffic Calming Policy will soon be available on an interactive CD, entitled Community Traffic Issues.

The City of Calgary is committed to ongoing improvement and welcomes your comments regarding this traffic calming policy. Please email comments to:
traffic.calming@calgary.ca

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1 INTRODUCTION

This document presents a recommended Traffic Calming Policy for the City of Calgary. The material in this document provides guidance regarding activities involved in identifying and implementing traffic calming measures, as well as technical information regarding the design and construction of traffic calming devices. This policy is intended to address existing situations, and is not intended to be a design guideline for new subdivision construction.

The primary intent of the Traffic Calming Policy is to address concerns which residents, Council and staff have regarding negative impacts of traffic on local neighbourhood streets. Guidelines are also presented for applying traffic calming measures on major roads and collector roads to mitigate the negative impacts of traffic, while still maintaining the ability of these roads to effectively transport goods and people.

1.1 WHAT IS TRAFFIC CALMING?

Most streets in Calgary are considered safe and pleasant streets along which to drive, walk or bicycle, and along which to live. On some streets, however, speeding vehicles, short-cutting traffic and conflicts among various road users detract from the safety and livability of the street. If problems are severe enough, residents and others may no longer consider that streets are safe or their neighbourhood is livable.

In these cases, traffic calming offers a means of resolving traffic and safety problems, and preserving and enhancing neighbourhood livability. Traffic calming describes a range of techniques which are used to influence motorist behaviour and prevent undesirable driving practices. Typically, traffic calming involves physical devices constructed in a roadway — such as speed humps, traffic circles and directional road closures, for example — and may also include regulatory changes such as turn prohibitions. The Institute of Transportation Engineers has developed a definition of traffic calming which sums this up:

> *Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users.*

1.2 WHY A POLICY IS NEEDED

As in most urban municipalities, traffic has become an issue on neighbourhood streets in Calgary. With increasing traffic congestion on major roads, some motorists begin looking for short-cuts along residential streets. As a result, many residents have become concerned

about speeding, short-cutting and safety for pedestrians, cyclists and motorists on their streets.

Many municipalities have responded to these concerns by implementing traffic calming measures — speed humps, traffic circles, curb extensions, diverters and a range of other measures intended to slow, discourage or obstruct unwanted traffic. Although most municipalities have been successful with traffic calming efforts, some municipalities have created more problems than they have solved. Typically, this has happened when traffic calming measures have been applied in a piecemeal manner, without an overall policy or plan, and without consideration of the implications of traffic calming.

To avoid this, Council and staff have developed this Traffic Calming Policy to proactively address traffic problems, to ensure that funds spent on traffic calming are spent cost-effectively, that problems are resolved, and that no new problems are created in the process.

The Traffic Calming Policy was prepared with input from community representatives, the Federation of Calgary Communities (FCC), and a working group comprised of staff representatives from all business units directly involved with traffic calming measures, including Transportation Solutions, Calgary Roads (Design, Assessment, Traffic Safety), Fire, Police, Calgary Transit, and Waste and Recycling.

1.3 SCOPE OF TRAFFIC CALMING

The focus of traffic calming is to address traffic and safety problems on City streets. This means, for example, speeding problems, short-cutting traffic through neighbourhood streets, and pedestrian and cyclist safety issues. It also means that traffic calming is used to address known problems. Although the primary focus of traffic calming is residential streets, traffic calming can be used on almost all types of streets.

There are other uses of traffic calming measures which are not encompassed by this policy, including:

- **New developments.** Developers sometimes wish to include traffic calming devices in new developments, either as a means of preventing traffic problems from occurring in future, to mitigate known impacts of development, or as an aesthetic enhancement. Examples include traffic circles, curb extensions and raised crosswalks. The use of traffic calming devices in new developments may be appropriate, provided that they would not unduly affect access for emergency vehicles, transit buses, trucks and other vehicles, and would not create safety concerns. Although the planning process described in Section 3 of this policy document would not apply in this case, the applicability guidelines and technical guidelines described in Sections 4 and 5 should be applied to any traffic calming devices proposed as part of new developments.

- **Future problems.** Traffic calming measures should generally only be used for existing traffic problems. Using traffic calming to address potential future problems should only be considered as part of an area-wide traffic calming plan as a means of avoiding problems which might be created by traffic diverted from other streets as a result of traffic calming measures implemented on those streets. In some cases, traffic calming measures which have no significant negative implications — such as curb extensions — can be used to prevent future problems.

- **Project-related works.** Traffic issues sometimes arise as a result of road construction and other transportation projects. Traffic calming measures may be used as part of these projects, during construction to mitigate impacts of detoured traffic or congestion, or as part of the final project plans. . Although the planning process described in Section 3 of this policy document would generally not apply to project-related works, the applicability guidelines and technical guidelines described in Sections 4 and 5 should be applied to any traffic calming devices proposed as part of transportation projects.

1.4 TRAFFIC CALMING RESOURCES

Calgary's Traffic Calming Policy was developed based on a review of traffic calming policies and programs in the following Canadian and U.S. communities:

- Vancouver, BC
- North Vancouver, BC
- Delta, BC
- Coquitlam, BC
- Saanich, BC
- Kelowna, BC
- Whistler, BC
- Toronto, ON
- Seattle, WA
- Bellevue, WA
- Portland, OR
- Palo Alto, CA
- Berkeley, CA
- Ventura, CA
- West Sacramento, CA
- Boulder, CO
- Santa Fe, NM
- Fairfax, VA
- Arlington, VA
- Asheville, NC
- Mobile, AL

The City's Traffic Calming Policy is intended to supplement the information contained in the *Canadian Guide to Neighbourhood Traffic Calming*, which was published in December 1998. The Guide was prepared for the Transportation Association of Canada and the Canadian Institute of Transportation Engineers, and is intended to provide consistent guidelines for traffic calming measures in Canada.

Rather than replicate the information contained in the Guide, this document provides additional information specific to conditions in Calgary, such as goals for traffic calming, means of prioritizing reported issues and responses, and techniques for applying traffic calming on major roads. The Traffic Calming Policy incorporates the practices described in the City's adopted policies on speed humps and traffic circles. As well, this document

updates design information contained in the Guide, and also provides information regarding implementation of traffic calming devices not contained in the Guide.

2 GOALS

This section describes the goals of the Traffic Calming Policy, and describes means of achieving these goals with specific objectives and principles. These goals, objectives and principles provide the basis for developing other aspects of the Traffic Calming Policy, described in subsequent sections.

2.1 GOALS AND OBJECTIVES

Residents, elected officials, City staff and other members of the community wish to achieve two key goals in undertaking neighbourhood traffic calming in Calgary:

- **Safety.** Traffic calming can make streets safe for everyone, including all road users — pedestrians, cyclists, motorists and others. Many conflicts and collisions which occur on local streets are the result of excessive speeds and excessive through traffic — the very problems that traffic calming can correct. Research has shown that specific traffic calming devices can reduce collision rates by as much as 90%.

- **Livability.** Traffic calming can help to preserve and enhance the livability of a neighbourhood by minimizing the negative impacts of traffic — noise, pollution and visual intrusion. Attractively designed and landscaped traffic calming devices can also enhance the streetscape, enhancing livability as a result.

It is intended that these goals be pursued in a manner which is consistent with the City's transportation and land use plans. This means that traffic calming measures are applied to improve safety and livability, while maintaining the effectiveness of the road network — particularly major roads and collector roads — for transporting people and goods.

Objectives to achieve the goals of improving safety and livability include:

- **Reduce vehicle speeds.** Speeds which are suitable for one type of road — a major road, for example — may be considered excessive on a collector road or local street within a neighbourhood. Measures which reduce vehicle speeds help to improve safety on neighbourhood streets for pedestrians, cyclists, motorists and other road users, and also help to improve the livability of a community by reducing noise and other negative impacts of traffic.

- **Discourage through traffic on local streets.** Local neighbourhood streets are primarily intended for access to properties, not for accommodating through traffic. Reducing through traffic helps to improve safety by reducing the potential for conflicts. Reducing through traffic also reduces delays for local traffic, pedestrians,

cyclists and other road users, and helps to improve livability by reducing noise and other negative impacts of traffic.

- **Minimize conflicts between street users.** Reducing conflicts among road users helps to improve safety by reducing the frequency of conflicts. Safety is also enhanced by reducing motor vehicle speeds, which reduces the likelihood and severity of a collision, should one occur.

- **Enhance the neighbourhood environment.** Reducing motor vehicle speeds, traffic volumes and conflicts helps to enhance the livability of a community by reducing the apparent dominance of traffic. This means reducing noise from traffic, reducing air pollution and reducing other traffic impacts on neighbourhood streets. Traffic calming measures can also enhance the streetscape by providing opportunities for landscaping and public art.

Another important objective — although not directly related to the goals of improving safety and livability — is to allocate funds cost-effectively. Ensuring that the costs of traffic calming are minimized and that the most cost-effective solutions are implemented will mean that traffic calming initiatives can be pursued as quickly as possible throughout the City, that the maximum number of traffic calming measures can be implemented, and that other transportation improvements will not be unnecessarily deferred as a result of traffic calming plans.

2.2 TRAFFIC CALMING PRINCIPLES

The information presented in subsequent sections of this document — as well as the information presented in the *Canadian Guide to Neighbourhood Traffic Calming* — provides guidelines regarding the applicability, location and design of specific traffic calming measures. To provide overall direction and guidance in the application of traffic calming measures, this section identifies several "principles" of traffic calming which are relevant to all traffic calming measures. These principles are equally relevant in addressing isolated, localized issues at a single intersection or on a single road, as well as addressing a range of issues within a wider area. Applying these principles in Calgary will maximize the effectiveness of resulting traffic calming plans, and will help to avoid mistakes which others have made. Applying these principles will also help to build community support for traffic calming plans, rather than opposition, by ensuring that plans meet the community's needs.

- **Involve the community.** Residents, business operators and others who live and work in a community must be involved in developing traffic calming plans. Their input is essential in identifying problems and in selecting traffic calming solutions. Involving the community builds support for a traffic calming plan, and enhances the credibility of a plan. Involving a broad cross-section of the community — with representation

from key streets and all geographical areas, as well as key stakeholders — minimizes the potential influence of special interest groups who might otherwise unduly influence the preparation of a plan. If the community is not adequately involved in preparing a traffic calming plan, residents and others in a community might oppose the plan — regardless of its technical merit — because they feel they were not properly consulted, that they were not listened to, or that the plan does not recognize the unique circumstances of their neighbourhood.

- **Identify the real problem.** Frequently, the perceived nature of a traffic problem is substantially different from the real problem. In some cases, the difference is so great that a solution intended to eliminate the perceived problem might make the real problem worse. For example, residents often mention both "traffic volume" and "speeding" as problems on their streets, but in many cases the problem is one or the other. It is important to identify the real problem, so as to select the appropriate measure. If the real problem is speeding, for example, a measure that significantly reduces the traffic volume on a street might inadvertently encourage speeding if fewer cars remain on the street to slow traffic. If the cause of a problem is a distance from where the problem occurs, it may be best treated by a solution at the source of the problem.

- **Quantify the problem.** Some problems are more significant than other problems. Some problems are all-day problems, whereas other problems occur only at certain times, in certain seasons or in certain directions. Some reported problems are not really problems at all. In order to ensure that appropriate traffic calming measures are implemented, it is essential that the extent of problems is quantified. This means collecting data, including traffic volumes, accident data, counts of pedestrians and cyclists, measures of delay and other data as appropriate.

- **Consider improvements to the major road network first.** No one shortcuts through a neighbourhood unless there's a reason to do so, and the reason is often congestion on adjacent major roads. There is a wide range of low-cost options available to improve operations on major roads, including fine-tuning signal timings, adding turn bays, and implementing turn prohibitions and parking restrictions. Improvements to the major road network should be considered first, as these might avoid or reduce the need for traffic calming measures on neighbourhood streets, and would enhance the effectiveness of a traffic calming plan.

- **Use self-enforcing measures.** These are measures which maintain a 24-hour presence, and do not require police enforcement to be effective. For example, traffic circles should be used instead of 4-way stops, speed humps should be used instead of speed restrictions, and directional closures and diverters should be used instead of all-day turn prohibitions. Measures that can be circumvented — such as a turn prohibition or a directional closure — should be used only at intersections with major

roads, where visibility and the presence of traffic discourage motorists from circumventing these measures.

- **Minimize access restrictions.** Generally, residents and other members of the community will be more supportive of traffic calming measures that do not restrict their access into and out of a neighbourhood. Diverters, barriers and closures restrict access for people who live or work on a particular street, and support for such measures is directly related to the severity of traffic problems. Where problems can be addressed with other traffic calming measures that are not as restrictive to access, these should be considered instead, or residents should at least be given a choice of measures.

- **Target automobiles and trucks only.** The purpose in implementing traffic calming measures is to affect automobiles and trucks, but not other modes. Consequently, traffic calming devices should be designed to permit scheduled transit buses, cyclists and pedestrians to pass through, while obstructing automobiles and trucks. Similarly, traffic calming devices should be located and designed so as not to impede emergency and service vehicles.

- **Implement measures on a temporary basis.** Where possible, inexpensive temporary devices should be installed to ensure that traffic calming devices will achieve the intended results, prior to constructing the devices on a permanent basis. A temporary installation also provides an opportunity to alter the geometrics of a device or make other changes prior to permanent installation. Temporary measures should resemble permanent measures as much as possible. It should be noted that where traffic calming measures cannot be cost-effectively constructed on a temporary basis or where modifications to the traffic calming measures are unlikely to be needed, they can be constructed on a permanent basis. Examples of these include speed humps and curb extensions, respectively.

- **Monitor conditions.** Traffic patterns change, and consequently it is important that traffic volumes, vehicle speeds, accident rates and other indicators of potential traffic problems are recorded and analyzed on an on-going basis. City staff currently collect much of this information, and consequently on-going monitoring can be carried out without a significant increase in data collection efforts.

3 PLANNING

This section describes the process of preparing and implementing traffic calming measures in the City. Traffic calming measures can be implemented on most roads, including local streets, collector and major roads. However, different approaches should be used for different types of issues.

Traffic issues can be grouped into five categories, as described below. The first two categories — isolated and area-wide issues — are addressed through traffic calming plans, as described in Section 3.1. Other issues are addressed as described in Section 3.2.

- **Isolated issues.** In many areas of the City — particularly in more suburban areas — traffic calming issues will arise in isolated, localized locations. Examples include pedestrian safety at intersections adjacent schools, speeding in playground zones, stop sign compliance at 4-way intersections, and conflicts at marked crosswalks. These issues can be addressed individually, on an isolated basis where there are no other issues or only a few other issues within the same area, and where there would be no chance of creating new problems or exacerbating other existing problems in the area.

- **Area-wide issues.** In some areas of the City — generally the inner-city areas — there will be a range of traffic calming issues on many streets within an area. For example, speeding and short-cutting traffic might be an issue on several streets, and pedestrian safety might be an issue at a number of locations throughout an area. In these cases, it is not appropriate to address each issue on an isolated basis, as a traffic calming solution intended to address one problem would likely create or exacerbate problems on adjacent streets. Instead, in this situation traffic calming solutions must be developed on an area-wide basis, considering all issues within an area. For the purposes of traffic calming, an area is defined by community boundaries, major roads and geographic (natural and man-made) barriers. If desired, two or more adjacent areas can be combined to create a single larger area for the purposes of developing traffic calming plans.

- **Operational issues.** Some traffic issues can be addressed without the need for a traffic calming plan, or traffic calming measures. Some traffic issues require an operational solution, and can be addressed through existing City procedures. Typically, these involve problems that affect traffic movement, road safety and parking. Examples of traffic operational issues include sight distance problems created by on-street parking, operational problems at signalized intersections, parking problems, roadway geometric issues and enforcement issues. In all cases, operational issues should be addressed only where they can be resolved without creating new problems or exacerbating other existing problems in the area.

- **Project-related issues.** In some cases, a road construction project, development project or other project might affect traffic on adjacent streets and create traffic issues. In these cases, traffic issues should be addressed as part of the project plans and development review process, rather through a separate process of developing a traffic calming plan. Potential issues which might arise in the future as a result of a road project or development project should not be addressed with a traffic calming solution until such time as a problem actually occurs.

- **Other issues.** Other traffic issues might not require a traffic calming solution or might not be appropriate to address with a traffic calming plan. These include, for example, speeding and safety issues on major roads and collector roads, traffic calming devices proposed on new roads in new developments, issues associated with special events, and education issues such as drinking and driving.

3.1 PROCESS FOR RESPONDING TO ISSUES

This section describes a process for responding to reported traffic issues, and prioritizing those issues which require a traffic calming plan as a solution. **Figure 3.1** illustrates the process of responding to reported traffic issues. Isolated and area-wide issues are addressed through traffic calming plans, as described in this section. Other issues are addressed as described in Section 3.2.

The majority of traffic calming measures will be planned and implemented under the direction of Transportation Solutions staff. In the course of preparing traffic calming plans, Transportation Solutions staff will consult with staff in other City business units, and will circulate proposed plans to other business units for review as appropriate.

3.1.1 SCREENING

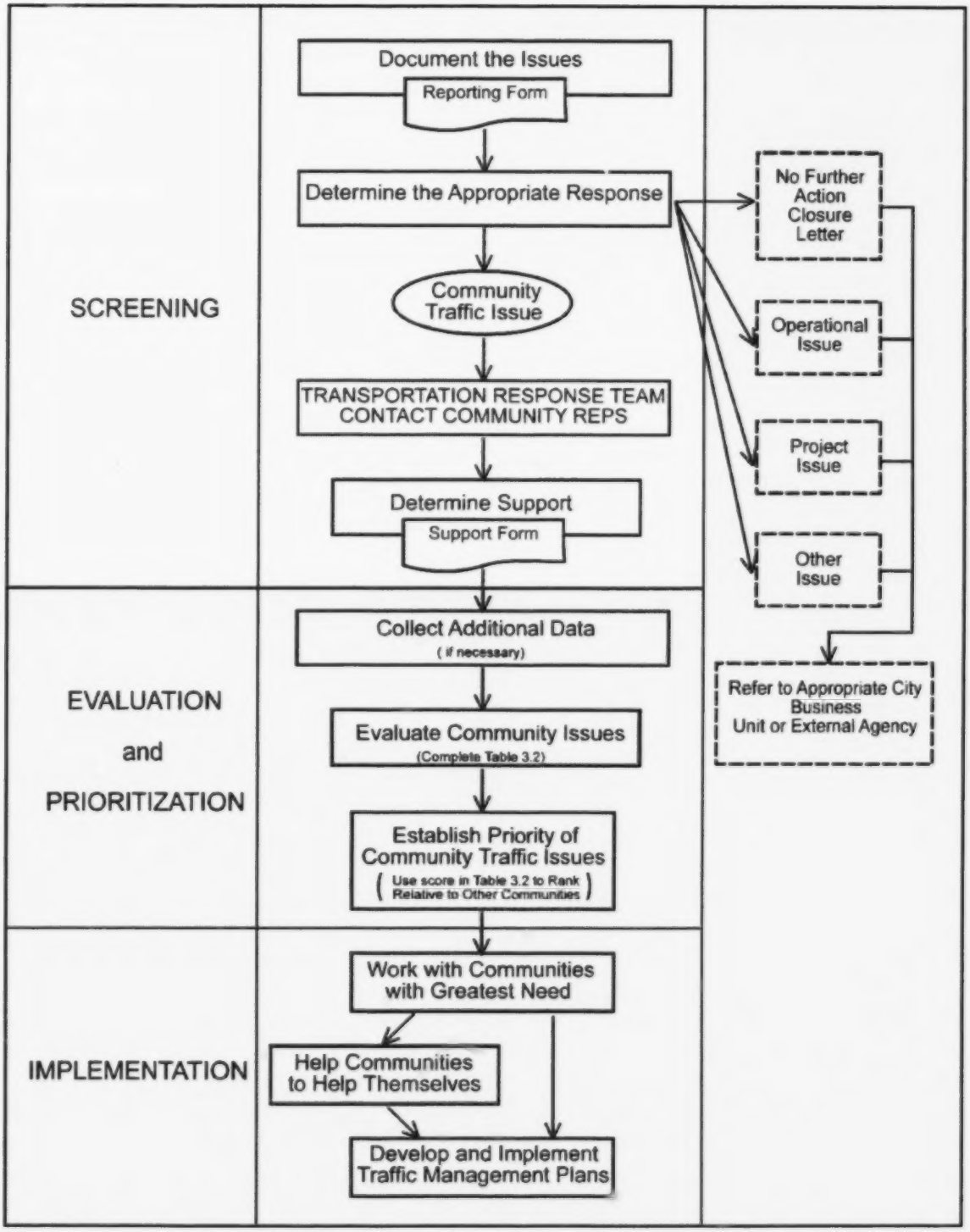
Screening is the first step in responding to reported traffic issues. Screening is undertaken for several reasons:

- To determine whether the issue is one which requires a traffic calming solution, or another response.

- For traffic calming issues, to identify the specific characteristics of the issue(s) — problem, location, time of day, duration, magnitude and so forth.

- For traffic calming issues, to determine whether others in the community agree that there is a problem, and to determine whether there is support for action to address the reported issue(s).

Figure 3.1
Process for Responding to Traffic Calming Issues


SCREENING
Document the Issues
Reporting Form
Determine the Appropriate Response
Community Traffic Issue
TRANSPORTATION RESPONSE TEAM CONTACT COMMUNITY REPS
Determine Support
Support Form
No Further Action Closure Letter
Operational Issue
Project Issue
Other Issue
EVALUATION and PRIORITIZATION
Collect Additional Data
(if necessary)
Evaluate Community Issues
(Complete Table 3.2)
Establish Priority of Community Traffic Issues
(Use score in Table 3.2 to Rank Relative to Other Communities)
Refer to Appropriate City Business Unit or External Agency
IMPLEMENTATION
Work with Communities with Greatest Need
Help Communities to Help Themselves
Develop and Implement Traffic Management Plans

- To ensure that City staff and resources are directed to those issues for which action is necessary and appropriate.

The screening process involves the following three activities:

1. Document the issue
2. Determine the appropriate response
3. Determine support for further action

The screening process is then followed by evaluation and prioritization activities, as described in Section 3.1.2.

DOCUMENT THE ISSUE

In order to effectively address a traffic calming issue, it is important that the issue be accurately described. Otherwise, a traffic calming solution might be developed which does not do enough to fully address the issue, or which does too much and is more restrictive than is needed to address the issue. For this reason, a means of reporting and documenting traffic calming issues is required.

The intent of this first activity in the screening process is to document traffic calming issues only, rather than document all traffic issues reported to the City. However, it is expected that some issues will be reported via this process which do not require a traffic calming solution. In this event, these issues will be forwarded to the appropriate City business unit or to the appropriate external agency.

The simplest and most effective means of documenting issues is a standardized reporting form, an example of which is included in the Appendix. Residents could download reporting forms from the City's web site, or obtain them by mail or fax. Residents would complete a reporting form, responding to questions regarding details of the issue(s). Residents would be asked to provide their names and contact information for follow-up, and would be required to obtain endorsements from their community association, alderman and police liaison.

Although it would be preferable for residents to complete reporting forms themselves, if appropriate City staff could assist in completing a reporting form in response to a complaint or request from a resident, based on information provided by the resident and supplemented with information provided by City staff as appropriate. Completed reporting forms would be submitted to Transportation Solutions.

Information requested on the reporting form would include a description of the location, magnitude, duration, times of day and other characteristics of the problem(s). In addition, residents would be asked to categorize issue(s) as:

- Pedestrian safety
- Other safety (motorists, cyclists, etc.)
- Speeding
- Short-cutting traffic
- Other (parking, etc.)

DETERMINE THE APPROPRIATE RESPONSE

Once an issue has been reported and documented, the next stage of the screening process is for Transportation Solutions staff to determine which of the following responses is appropriate for the issue. In many cases, traffic issues can be addressed quickly without requiring a traffic calming solution.

A traffic calming response is appropriate where there is one or more identified traffic or safety issues which can be effectively addressed with a traffic calming solution. The screening process should continue to the next activity, which involves determining support for action.

In some cases, issues will be relatively isolated. These issues are typically limited to one or two blocks of one or two streets, with no reported issues on nearby streets, and can be addressed in isolation from other issues. In other cases, there will be several reported issues within a contiguous area bounded by major roads and/or physical barriers (geographic or man-made). In this latter case, these issues should not be treated as isolated problems, but rather should be grouped together and treated on an area-wide basis.

In some cases, it would not be appropriate to respond to a reported issue with a traffic calming solution. Instead, other responses would be more appropriate, including:

- **Operational response.** Significant safety issues might require an immediate response. Other operational issues can be addressed through existing City procedures. In either case, these operational issues can be addressed without requiring a traffic calming solution, and the remainder of the screening process does not apply.

- **Project response.** Traffic calming issues related to specific projects should be addressed through the project. Examples might include issues related to new developments, issues along a major road corridor, issues related to road network development, issues resulting from traffic diverted by a road construction project, and

issues associated with special events. Reported issues should be directed to the appropriate City business unit or external agency responsible for the project. In some cases, it may be appropriate for Transportation Solutions staff to liaise with staff in other business units regarding project-related traffic calming solutions.

- **Other response.** Issues for which a traffic calming solution would not be required nor would be appropriate should be directed to the appropriate City business unit or external agency. These might include, for example, issues related to land use, commercial operations, road maintenance, traffic engineering, transit service, utilities, and bylaw enforcement.

- **No further action.** For issues for which no actions are determined to be required, a closure letter should be sent to the community describing the reasons why no further action is being taken. A similar letter should be sent to the community in response to issues for which a traffic calming solution is not the appropriate action.

In all cases, once the appropriate response has been determined, Transportation Solutions staff will advise the community association and other community representatives of the selected response.

DETERMINE SUPPORT FOR FURTHER ACTION

For isolated and area-wide issues, it is important to determine whether there is a minimum level of support within the community for action to address the issue. This helps to avoid situations where residents might consider a solution more of a problem than the issue it was intended to address. It also helps to avoid City staff spending time and funds to respond to a reported issue that is only considered a problem by a small number of people.

At. this stage in addressing reported traffic calming issues, it is not necessary to demonstrate majority support within the community for a traffic calming solution. Rather, it is only necessary to demonstrate that a sufficient number of people within the community who are affected by the reported issue and who would be affected by the solution consider that there is a need to examine the issue further. Consequently, a sufficient level of community support would be indicated by a minimum of one third of affected households in cases of isolated issues, and a minimum of 20% of affected households in cases of area-wide issues. Where a community has greater than 40% apartments, lower levels of support and alternative methods of demonstrating support will be considered for isolated and area-wide issues. For isolated issues, affected households are typically those within the block(s) of the street(s) where problems are reported, as well as all households within one block of the block(s) where problems are reported.

Residents would be responsible for documenting community support, rather than City staff. The simplest means of indicating community support is a form which lists the

addresses of all affected households, and includes space for signatures of residents of at least 20% of these households. An example of such a form is included in the Appendix. City staff would identify affected households and would provide forms with addresses of these households included on the form. Residents would then contact persons in affected households to obtain the minimum required number of signatures. It should be noted that although a minimum of 20% of households are required to indicate support, in the subsequent evaluation and prioritization process, issues for which more than 25% support is obtained are given greater weight in determining priorities. This means that residents should seek to obtain signatures from as many affected households as possible.

In addition to the support of residents in the area, agreement that community traffic issues need to be addressed is required from the community association, alderman and police representatives. Agreement from these groups and persons should be documented in writing, with a letter or e-mail.

3.1.2 EVALUATION AND PRIORITIZATION

After the screening process has been completed and community support for further action has been demonstrated, the next step is to evaluate and prioritize the issue. As described in this section, this involves assigning a numerical rating to an issue based on a set of evaluation criteria, and then determining the relative priority of all reported issues based on their ratings.

The evaluation and prioritization process ensures that the most serious and most extensive issues are addressed first. It ensures that traffic calming funds are allocated where they will provide the greatest benefit. And it ensures that all areas of the City are treated equally and fairly.

City staff would address issues in order of priority, as funding and resources permit. Highest priority issues would be addressed first, and other issues would be addressed once higher-priority issues had been resolved. In general, City staff would address as many issues each year as possible, depending on staffing and funding availability.

ROAD CHARACTERISTICS

Local streets have different characteristics and functions than low-volume collector roads. Consequently, different criteria are used to evaluate traffic calming issues on local streets as compared with low-volume collector roads. Because there are currently several adopted and proposed road classifications for collector and major roads in the City, within the scope of this Traffic Calming Policy it is necessary to define what is meant by a "local street" and a "low-volume collector" road. **Table 3.1** indicates typical conditions for each type of road. It should be noted that this information is provided as a general indication of conditions on local streets and low-volume collector roads, and that some conditions on some roads may vary from these typical conditions. Traffic calming issues

on other types of roads — major roads, higher-volume collector roads and industrial roads, for example — are addressed on a project basis as described in Section 3.2.

Table 3.1
Characteristics of Local Streets and Low-Volume Collector Roads

Typical Conditions	Local Street	Low-Volume Collector
Function	Provide access to residential properties and other uses	Provide access to properties, accommodate traffic travelling to/from other neighbourhood streets
Volume	Typically up to 1,500 vehicles/day	Typically 1,500 to 5,000 vehicles/day
Speed limit	50 km/h, may be reduced to 40 km/h or 30 km/h	50 km/h, may be reduced to 40 km/h or 30 km/h
Centreline	Only where required for safety or operations	Continuous centreline
Parking	One or both sides, may be prohibited for safety or operations	One or both sides where additional road space is provided
Bicycle facilities	No designated space for bicycles — cyclists and motorists share the road	No designated space for bicycles — cyclists and motorists share the road
Transit service	No	Permitted

TRAFFIC CALMING ISSUES

Table 3.2 summarizes evaluation criteria for traffic calming issues. Issues are evaluated according to criteria which reflect the goals of traffic calming described in Section 2 — specifically safety and livability — as well as objectives of reducing speed and short-cutting volume, and minimizing conflicts between road users. Community support is also considered in the evaluation, as a basis for assigning higher priority to areas with higher levels of community support.

Because the number, type and extent of issues will vary from one area to another, it is not possible to use a quantitative means of assigning ratings to each area. Instead, each criterion is evaluated on a subjective basis, on a scale of zero to five, ten or twenty, depending on the relative importance of each criterion. In each case, a higher score represents a more significant issue.

The types of issues to be evaluated using the criteria in **Table 3.2** include both isolated and area-wide traffic issues. In all cases, worst case conditions are to be considered in evaluating the issues.

Priorities should be re-evaluated on an annual basis, to account for changes in traffic and road conditions, and to incorporate additional data not currently available.

Table 3.2
Evaluation Criteria — Traffic Calming Issues

Criteria	Measurement	Rating	
		Scale	Indicator
Speed	24-hour 85th percentile speeds in both directions (during daytime hours for school and playground zones)	0 to 20	20 represents area with highest recorded speed differentials and greatest number of streets with speeding
Volume	Percentage short-cutting traffic in peak 2-hour period, in peak direction, on most significant short-cutting route, and daily traffic volume	0 to 20	20 represents area with highest volume of short-cutting and highest daily traffic volume relative to road classification
Collisions	Collision rate and severity of reported collisions in 3 years at most significant location (most recent data available)	0 to 20	20 represents area with highest number and severity of collisions
Safety	Sidewalks — proportion of neighbourhood streets with continuous sidewalks on at least one side	0 to 5	5 represents area with fewest sidewalks
	Pedestrian — number of schools and major pedestrian generators in area, and numbers of pedestrians	0 to 10	10 represents area with highest number of pedestrian generators and highest level of pedestrian use
	Cyclists — number of designated bicycle routes in area, and number of cyclists	0 to 5	5 represents area with highest number of bicycle routes and highest level of bicycle use
Community support	Percentage of households supporting requested action	0 to 20	20 represents area with highest level of support

3.1.3 IMPLEMENTATION

The traffic study process begins once a community or isolated location is identified as the highest priority according to the evaluation process described in Section 3.1.2. City staff and community Traffic Committee members will jointly determine the most appropriate traffic calming measures to address the identified issues. **Table 3.3** summarizes the steps involved in the community traffic study process.

Table 3.3
Process for Conducting Community Traffic Studies

Activity		Duration
Stage 1 Problem identification	• Establish Traffic Committee • Identify traffic concerns • Collect and analyze traffic and safety data • Establish study goals and objectives	2 to 6 months
Stage 2 Traffic Plan	• Identify potential solutions • Develop proposed Traffic Plan • Determine community support for traffic plan, typically through a survey	2 to 5 months
Stage 3 Trial measures	• Present Traffic Plan to Standing Policy Committee on Transportation, Transit and Parking for approval, if necessary • Implement traffic calming measures for a trial period. • Monitor traffic conditions during the trial period; assess benefits and impacts to the neighbourhood and transportation network	12 months
Stage 4 Project completion	• Review Traffic Plan and identify changes as appropriate • Present the final version of Traffic Plan to community for approval • Forward Traffic Plan to Standing Policy Committee on Transportation, Transit and Parking for approval, if necessary	2 to 4 months

Should the demands for community traffic work exceed the abilities of the City staff and available resources, it is possible to supplement City-funded implementation of priority projects with the assistance of a professional transportation consultant, subject to available funds. The transportation consulting contract would be with the City of Calgary. Traffic calming measures identified by a transportation consultant would conform to this policy and would be implemented in order of priority. In exceptional circumstances, this approach may be used in a timely fashion to provide communities the opportunity to address issues of concern. This approach would not divert staff resources from higher-priority issues elsewhere in the City.

3.1.4 FUNDING

Traffic calming measures are currently funded by the City from general revenues, and should continue to be funded in this manner. The rationale for doing so is that other road and transportation improvements are funded from general revenues, and that causes of traffic problems within neighbourhoods are typically city-wide in nature or caused by traffic congestion in a nearby corridor, and are not specific to a neighbourhood.

ENHANCEMENTS

All traffic calming measures would be constructed at the City's cost to a "basic" standard, which would be both attractive and functional. Examples of "basic" construction include:

- Speed humps and raised crosswalks would be constructed of asphalt, with thermoplastic pavement markings and required signage. Other construction materials would represent an enhancement above the "basic" standard.

- Traffic circles and median islands would be constructed with a concrete curb around the perimeter, and with a hard surface (asphalt or concrete) in the centre. Landscaping and other construction materials would represent an enhancement above the "basic" standard.

- Curb extensions and directional closures would be constructed with a concrete curb, concrete sidewalks, and grass or a hard surface in the remaining area. Landscaping, textured and coloured concrete, paving stones and other construction materials would represent an enhancement above the "basic" standard.

The funding process for traffic calming measures would be enhanced by allocating an additional 10% of the total cost of basic traffic calming measures for streetscape enhancements. This means, for example, that if the cost of constructing a traffic circle is $7,000, an additional 10% or $700 would be available for streetscape enhancements.

This 10% additional funding could be used to enhance some or all of the traffic calming measures, or could be used for other streetscape enhancements within the community. Examples of such enhancements include upgraded landscaping in traffic circles and curb extensions, special concrete and asphalt finishes, street furniture, bicycle racks, additional signage and artwork. Decisions regarding the use of this 10% additional funding would be made by community representatives, with assistance from City staff. As well, the community would be required to enter into a contractual agreement with the City for the maintenance of the enhanced features such as vegetation or street furniture.

The additional 10% funding would be provided by the City as part of the funding of isolated and area-wide traffic calming plans. Enhancements which would require more than the additional 10% funding would be funded by the community. Funds could be raised by residents and other community members in a variety of ways, including pledges, donations, auctions and sales, or through the local improvement process if residents are in agreement.

All enhancements would be in accordance with applicable City standards, traffic calming design guidelines included in Section 5 of this policy, and guidelines in the *Canadian Guide to Neighbourhood Traffic Calming*.

3.2 OTHER ISSUES

Although the majority of traffic calming measures will likely be implemented on local streets and low-volume collector roads, following the process described in Section 3.1, there are other situations in which it may be desirable to implement traffic calming measures. This section describes other approaches to implementing traffic calming measures in the City.

- **Alleys.** Speeding and short-cutting can be issues in some alleys, usually as a result of congestion on nearby roads or commercial traffic. The City responds to speeding and short-cutting issues in alleys by installing modified speed humps designed for use in alleys, and with other solutions such as one-way operation or access restrictions as appropriate. Speed humps or other appropriate measures can be installed in any alley where two-thirds of property owners who abut the alley segment support their installation. The cost of installation is assessed to all abutting property owners. Alleys which are not paved would also need to be paved, and the cost of paving assessed to all abutting property owners.

- **Major roads.** Some traffic calming measures can be implemented on major roads and collector roads with traffic volumes of more than approximately 5,000 vehicles per day. A different approach should be used in implementing measures on major roads than the approach for local streets and low-volume collector roads. On major roads, traffic calming should be undertaken on a project basis, which typically

encompasses a corridor or area of the City. Ideally, traffic calming initiatives should be part of a larger project which considers other traffic and transportation options, such as changes to traffic signals and roadway laning, improved pedestrian facilities and crossings, space for bicycles and parking, and streetscape enhancements. Generally, only those traffic calming measures should be considered which would not affect the capacity of a major road, and which would not reduce traffic speeds below the posted speed limit.

- **Road construction projects.** Where traffic is diverted or delayed as a result of a construction project on a major road, there is the potential for traffic to divert to adjacent neighbourhood streets. As part of construction plans, temporary traffic calming measures may be identified on adjacent local streets and low-volume collector roads as needed to mitigate any effects of diverted traffic. Although the intent would be to remove the temporary measures when the road construction project is completed, in some cases it may be desirable to leave measures in place permanently.

- **Special events.** As with road construction projects, delays and diversions to traffic as a result of special events can divert traffic to nearby neighbourhood streets and create problems on these streets. Transportation plans for special events should include temporary traffic calming measures on adjacent local streets and low-volume collector roads as needed to mitigate any effects of diverted traffic. Where possible, preparation of a temporary traffic calming plan should be required as part of the permit process for a special event. In all cases, the costs of temporary traffic calming measures associated with a special event should be paid entirely by the organization(s) hosting the event.

- **New developments.** Frequently, developers propose traffic calming devices as features in a new developments, to improve aesthetics, to prevent speeding and for other reasons. In all cases, these devices should conform to the guidelines for applicability and design presented in Sections 4 and 5 of this document. Permits and other agreements between the City and developer should also address the issue of the responsibility for and costs of any on-going maintenance needs.

3.3 COMMUNITY INITIATIVES

This section identifies a range of initiatives which individuals and community groups can undertake as a means of addressing traffic issues. The intent of these initiatives is to help communities help themselves. Together with any actions undertaken by the City, these initiatives result in a balanced response to local traffic issues.

Experience in other communities has shown that information, education, and awareness initiatives can affect motorists' behaviour and can reduce speeding, short-cutting and other traffic problems. Individuals and community groups can work with the police, City staff and other agencies, and through these agencies can access services and resources at no or little cost. Examples of initiatives which community members can undertake are described below. These initiatives can be expanded over time, and new initiatives developed to further enable individuals and community groups to assist in addressing traffic issues.

- **Community publications.** Community newsletters, web sites, billboards, bulletins and the similar publications and information materials can be used to highlight traffic concerns and encourage more appropriate behaviour among motorists.

- **Community events.** Public meetings and community open houses involving residents and stakeholders can be an effective means of identifying traffic issues and options available to deal with problems. It is recommended that Transportation Solutions staff or other City representatives be invited to community events to contribute to the discussion of traffic issues, options and means of addressing problems.

- **City of Calgary publications.** The City of Calgary has a wide range of material available on subjects related to traffic and traffic safety, including plain language Traffic TIPS brochures, print-ready material, electronic material, maps and documents. Most of these are available free of charge to the public. The City also maintains a web site with considerable information, much of which can be downloaded or printed for reference. Material available on the web site includes, for example, Traffic TIPS brochures, Calgary Transit maps, hazardous goods route maps, pathway and bikeway maps, road classification maps, and policy documents relating to traffic controls and traffic calming measures.

- **Community Speeding Awareness Program.** Through this City program, community groups can borrow a portable speed display board connected to a radar unit, which is used to advise motorists of their speeds. The board displays the speed motorists are driving, and is intended to be a passive educational tool to encourage

motorists to drive at or below the posted speed on neighbourhood streets. The speed display board is typically loaned to community groups for a one-week period.

- **Portable speed advisory signs.** This City program involves placing a series of five educational signs on a main access street into a community. These signs are a passive educational tool targeted to motorists, indicating the posted speed, advising motorists as to what speeding fines are, and including a thank you message from the community.

- **Alley speed limit signs.** The speed limit in alleys in the City is 15 km/h, as established in City bylaws. Although the City does not typically sign alleys, where an alley speeding problem exists, the City makes available laminated cardboard alley speed limit signs that can be posted temporarily as a passive educational tool.

- **Trip reduction initiatives.** A wide range of initiatives can be used to reduce vehicle trips and the amount of traffic on neighbourhood streets. Examples include carpool programs, work at home arrangements, car-sharing initiatives, flextime and compressed workweek arrangements with employers, special transit services, and use of the pathway and bikeway system for walking and cycling trips. Many of these initiatives also have significant health, environment and economic benefits. Information regarding these initiatives is available through the City of Calgary website, carpool.ca and teletrips.com.

Liaison With Police

Communications with the police through community meetings and direct liaison can be an effective means of addressing local traffic issues. In many communities, police services have found that policing efforts planned and executed in consultation with the community are better able to target neighbourhood traffic issues. Some police officers are assigned traffic education duties and proactively meet and provide information and training to community groups. Other officers assigned to schools can assist in addressing traffic, parking and safety issues in and around schools. In all cases, to make the best use of police resources, information regarding traffic and safety issues provided to the police should be detailed, and should identify the times, locations and nature of the traffic issues.

Liaison With Schools

Community groups can work with school board authorities and parent-teacher groups to discuss and highlight traffic issues that are of concern in the community, notably in and around schools. Concerns can be discussed and communicated to parents at community events and through newsletters. School-related safety issues typically include parking and congestion at schools, traffic generated by parents picking up and dropping off their children, improper traffic manoeuvres and similar concerns.

LIAISON WITH BUSINESSES AND INSTITUTIONS

Many neighbourhoods include not only residential dwellings but also commercial business and institutions. Sometimes, commercial and institutional traffic can be a problem on streets in the residential portion of a neighbourhood. In neighbourhoods in other communities where this has been the case, individuals and community groups have worked with business and institutions to develop workable solutions to traffic problems. In many cases, businesses and institutions did not realize that traffic which they generated was causing a problem in the neighbourhood. Even though residents may have complained among themselves and to City staff, residents had not directly contacted the businesses or institutions generating the traffic. Direct communication between residents, businesses and institutions is often the best way to draw attention to the traffic issues and subsequently identify and implement solutions agreeable to all parties. It may be advisable to include City staff in discussions and initial contacts to provide additional information and assist in considering solutions to traffic problems.

4 TRAFFIC CALMING MEASURES

This section identifies traffic calming measures which are appropriate for use in Calgary, and ones which are not. For those measures which are appropriate for use in Calgary, information is provided regarding the conditions in which each measure should be used, to supplement the information published in the *Canadian Guide to Neighbourhood Traffic Calming*.

The Guide identifies a total of 25 traffic calming measures, including several measures — such as stop signs — that are used in some municipalities for traffic calming purposes, although this is not their intended function. The 25 traffic calming measures identified in the Guide are listed in **Table 4.1**, plus speed cushions, which are not identified in the Guide. Some of these devices are identified as "use with caution," for the reasons discussed in the remainder of this section. Several devices should not be used *as traffic calming measures* — it should be noted that some of these devices are appropriate if used as they are intended (such as rumble strips). Reasons why these measures should not be used are discussed in the remainder of this section.

4.1 VERTICAL DEFLECTION

Vertical deflection measures are those which create vertical motion in a motor vehicle when it is driven over the device. Vertical deflection measures should be used only on local streets and low-volume collector roads. As described below, several vertical deflection measures do not provide significant traffic calming benefits, and therefore should not be used as traffic calming measures.

- **Speed humps** can be used on all local streets, with only the following limitations:
  - Speed humps should not be used on primary emergency response routes, or on transit routes with frequent service. If a form of vertical deflection is necessary to discourage speeding on local streets that are primary emergency response routes or transit routes, speed cushions should be considered instead.
  - The Guide indicates that speed humps can be used on grades of up to 8%. However, due to concerns regarding traction in winter conditions, at this time speed humps are approved for use on grades of up to 4% only. During the next year or so, the City will test speed humps on grades of up to 6%. If the results of these tests are positive, then speed humps will be approved for use on grades of up to 6%, and the City will then test speed humps on grades of up to 8%, consistent with the *Canadian Guide to Neighbourhood Traffic Calming*.

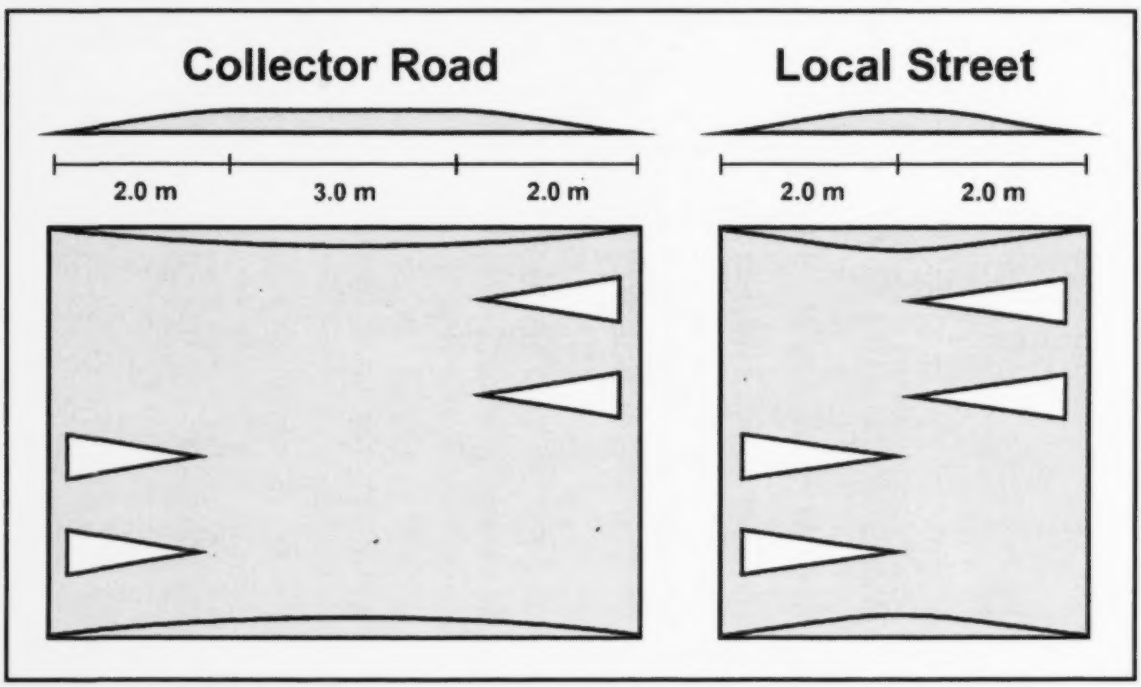
Table 4.1
Traffic Calming Measures For Use in Calgary

Measures		Local Street	Low-Vol. Collector	Other Collector	Major
Vertical Deflection	• Speed hump	✓	✓	×	×
	• Speed cushion	✓	✓	×	×
	• Raised crosswalk	✓	✓	×	×
	• Sidewalk extension	✓	×	×	×
	• Textured crosswalk	×	×	×	×
	• Rumble strips	×	×	×	×
	• Raised intersection	×	×	×	×
Horizontal Deflection	• Curb extension	✓	✓	✓	✓
	• Traffic circle	✓	~	×	×
	• Raised median island	✓	✓	✓	✓
	• Corner radius reduction	✓	✓	✓	~
	• Chicane, 1-lane	✓	×	×	×
	• Chicane, 2-lane	×	×	×	×
	• On-street parking	✓	✓	✓	~
Obstruction	• Directional closure	✓	~	×	×
	• Right-in/right-out island	✓	~	×	×
	• Raised median through intersection	✓	✓	×	×
	• Intersection channelization	✓	✓	~	~
	• Diverter	✓	~	×	×
	• Full closure	~	×	×	×
Signage (when used primarily for traffic calming purposes)	• Traffic-calmed neighbourhood	✓	✓	×	×
	• Turn prohibited	~	~	~	~
	• Through traffic prohibited	~	~	~	~
	• One way	~	~	×	×
	• Maximum speed	×	×	×	×
	• Yield	×	×	×	×
	• Stop	×	×	×	×

✓ = Appropriate measures ~ = Use with caution × = Not recommended

- **Speed humps** can be used on low-volume collector roads. "Local street" speed humps (illustrated in **Figure 4.1**) can be used on low-volume collector roads with traffic volumes of less than 2,500 vehicles per day. "Collector road" speed humps (also illustrated in **Figure 4.1**) should be used on collector roads with traffic volumes of less than 5,000 vehicles per day. However, because motor vehicles can travel over collector road speed humps at 40 km/h to 45 km/h, collector road speed humps should not be used in 30 km/h zones — local street speed humps 4.0 m in length should be used instead. Speed humps on collector roads will be considered under these guidelines on a case-by-case basis, with consideration of site-specific issues such as network implications, intersection spacing and topography.

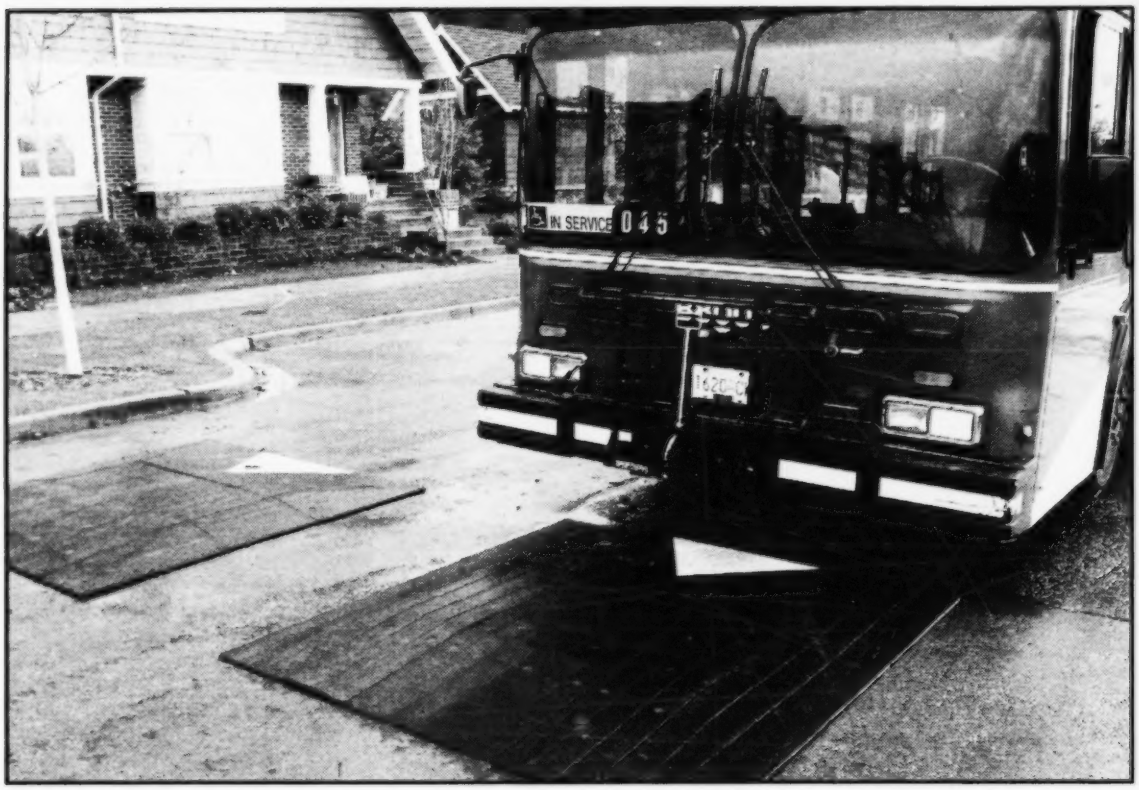
Figure 4.1
Collector Road and Local Street Speed Humps



- **Speed cushions** enable trucks, buses and other large vehicles to pass over the cushions without having to slow as much as with speed humps, as illustrated in **Figures 4.2 and 4.3**. Large vehicles can travel over speed cushions at speeds of up to 50 km/h. On the other hand, motorists in passenger vehicles typically slow to 30 km/h or less when travelling over speed cushions, in the same manner as they would when travelling over speed humps. Because they do not affect large vehicles to the same extent as speed humps do, speed cushions should be considered as an alternative to speed humps on primary emergency response routes, on transit routes with frequent service, and on other local streets and low-volume collector roads where

it is desirable to avoid unduly delaying large vehicles. It is recommended that speed cushions be tested on an opportunity basis should suitable locations be identified.

Figure 4.2
Speed Cushions with Transit Bus



- **Raised crosswalks** should be used only on local streets and low-volume collector roads, at intersections and in midblock locations where a marked crosswalk is warranted according to the City's crosswalk policies. Raised crosswalks can be combined with horizontal deflection measures such as curb extensions and/or median islands.

- **Sidewalk extensions** should be used only on local streets. Sidewalk extensions can be used at intersections with other local streets, collector roads or major roads.

- **Textured crosswalks** are often used to improve the appearance of an intersection. Although appropriate for this purpose, they have no significant traffic calming benefit. Over time, the contrasting colour of the crosswalk may become less distinct, reducing the visual significance of the textured crosswalk. When constructed with interlocking pavers, textured crosswalks can also be a significant maintenance issue.

As well, textured crosswalks also create discomfort for wheelchair users, in-line skaters and skateboarders.

Figure 4.3
Speed Cushion with Automobile

- **Rumble strips** are effective when used to alert motorists to the presence of a stop sign, crosswalk, reduced speed zone or potentially hazardous situation. Experience has shown that rumble strips have no effect on vehicle speeds or volumes, however, and the noise and vibration created by rumble strips is significant. Consequently, rumble strips should not be used as a traffic calming measure.

- **Raised intersections** are not readily noticeable to motorists and other roadway users. Consequently, the effect of a raised intersection on vehicle speeds and traffic volumes is minor at best. Given the high cost of retrofitting raised intersections on existing roadways, raised intersections should not be used in the City as a traffic calming measure.

4.2 HORIZONTAL DEFLECTION

Horizontal deflection measures are those which require a motorist to steer around them. Devices which result in minimal deflection of a vehicle path — such as curb extensions and median islands — can be used on all roads. Devices which require significant deflection — such as traffic circles and chicanes — should only be used on local streets.

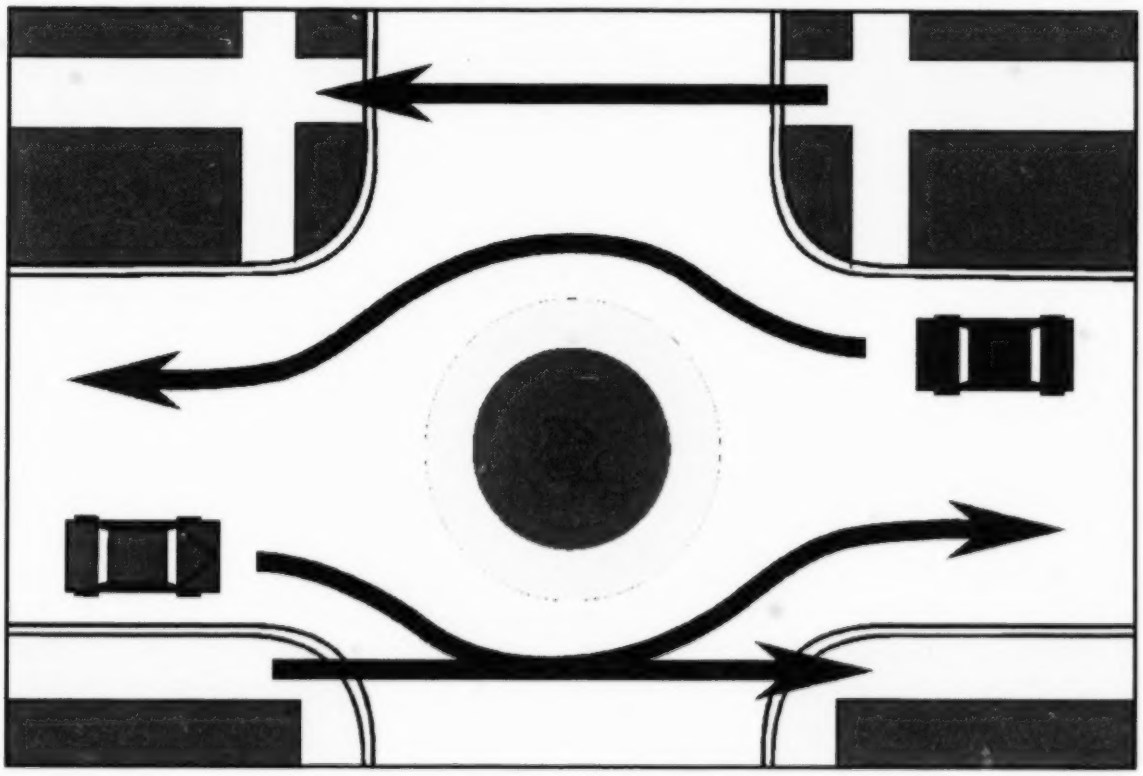
- **Curb extensions** can be used on all roads. On local streets and on low-volume collector roads with less than approximately 2,500 vehicles per day, the width of the opening between opposing curb extensions can be as narrow as 6.0 m, depending on site-specific geometric conditions. On major roads and on collector roads with more than approximately 2,500 vehicles per day, the width of the travel lane adjacent a curb extension should be at least 3.5 m, and should be 4.0 m to 4.3 m where it is desirable to provide space for cyclists. Curb extensions can be used at intersections and at mid-block locations, and can be used in combination with median islands or traffic circles.

- **Traffic circles** can be used at intersections of two local streets, with three, four or more approaches to the intersection. Traffic circles can also be used at intersections between low-volume collector roads and local streets, provided that the volume on the low-volume collector road is not more than approximately three times the volume on the local street, so as to avoid problems with traffic on the collector road not yielding to vehicles which have entered the circle from the local street. Traffic circles should not be used on transit routes, and the use of traffic circles on primary emergency response routes should be minimized.

- **Traffic circles** should only be used on roads with monolithic sidewalks in retrofit situations to address identified traffic problems (monolithic sidewalks are adjacent the curb, without a separating boulevard). Where traffic circles are constructed on new or upgraded roadways with no previous traffic problems, sidewalks should be separated from curbs with a boulevard at least 2 m in width. This separation will minimize conflicts between pedestrians and motorists, as illustrated in **Figure 4.4.**

- **Median islands** can be used on all roads where there is sufficient road width to incorporate an island at least 1.5 m wide. Median islands can be used at intersections and at mid-block locations, and can be used in combination with curb extensions.

Figure 4.4
Pedestrian-Vehicle Conflict at Traffic Circle with Mono Sidewalks



- **Corner radii** should be as small as possible, in order to maximize safety for pedestrians. Small radii reduce the crossing distance for pedestrians, increase the visibility of pedestrians to motorists, and reduce the speeds of turning vehicles, thereby reducing the likelihood and consequences of a collision with a pedestrian. corner radii should be designed only to accommodate a single-unit truck (SU-9), except in locations where there are frequently larger trucks turning. At intersections where one or both roads is a local street, it is acceptable for single-unit trucks to cross to the left side of a local street to complete a turn, as illustrated in **Figure 4.5**. This means that smaller corner radii can be used.

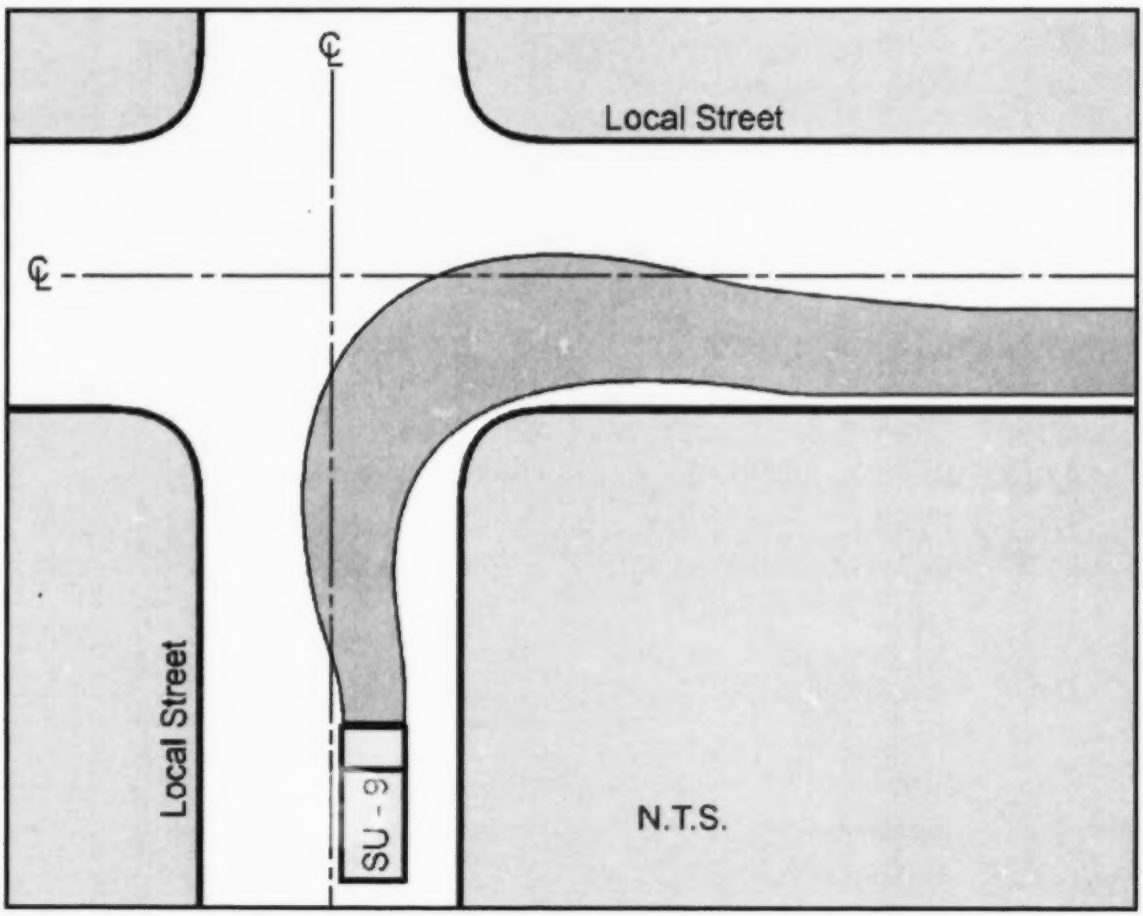
- **One-lane chicanes** should be used only on local streets with traffic volumes of at least 1,500 vehicles per day, and with a peak period directional split within the range of 50/50 to 65/35. At lower traffic volumes or more lopsided directional splits, the effects of a one-lane chicane in deterring short-cutting traffic and slowing vehicles are reduced.

- **Two-lane chicanes** have not proven to be effective in reducing vehicle volumes, and have only minor effects on vehicle speeds. These negligible benefits are offset by

potential unsafe situations created when some motorists cross the centreline of the roadway in order to minimize horizontal deflection. Consequently, two-lane chicanes should not be used as a traffic calming measure.

- **Parking** is an inexpensive and effective form of traffic calming, and consequently on-street parking should not be prohibited on local streets and low-volume collector roads unless necessary. On other collector roads and on major roads, on-street parking should only be permitted where there is a minimum of 2.4 m available for on-street parking, plus a minimum of 3.5 m for the adjacent travel lane.

Figure 4.5
Single-Unit Truck Turning on Local Street



4.3 OBSTRUCTIONS

Obstructions should generally be avoided. Obstructions should only be used where a horizontal or vertical deflection measure will not adequately address a traffic problem. Obstructions should only be used on local streets, and on low-volume collectors where there is not a likelihood that traffic would be diverted to nearby local streets.

- **Directional closures and right-in/right-out islands** should only be used at intersections with major roads. At other locations, there is typically not sufficient traffic nor on-street activity to deter motorists from circumventing the devices.

- **Raised median islands through intersections** can be used on all roads, but should only be used to obstruct through movements and left turns to and from local streets, as well as low-volume collector roads with less than approximately 2,500 vehicles per day.

- **Intersection channellization** — which describes the use of channellization to obstruct specific movements — can be used on all roads.

- **Diverters** should only be used at intersections of two local streets, and should not be used on transit routes nor primary emergency response routes. Diverters should be designed to be passable by pedestrians, cyclists and emergency vehicles with minimum delay.

- **Full closures** should be considered only as a last resort, as they restrict access for residents and others travelling to and from locations within a neighbourhood. Less restrictive measures should be considered first, as in many cases these can achieve the same results, without the severe impacts associated with a full closure. If a full closure is to be implemented, through access should be maintained for emergency vehicles, pedestrians, bicycles and transit vehicles (if located on a transit route).

4.4 SIGNAGE

Regulatory signs are generally not effective as traffic calming measures. Self-enforcing measures — horizontal and vertical deflection measures, and obstructions — should be used instead of signage where possible.

- **Stop, Yield and Maximum Speed signs** should not be used in the City as traffic calming measures. Stop, Yield and Maximu n Speed signs are intended only for traffic control purposes. The unwarranted use of these signs has been shown to have little effect on vehicles speeds and volumes, and results in increased non-compliance with traffic regulations. Not only is the original problem not addressed, but a new

enforcement problem is often created. Consequently, additional installations of Stop, Yield and Maximum Speed signs for traffic calming purposes should be avoided, and existing installations of unwarranted signs should be evaluated when traffic calming plans are prepared, to identify traffic calming measures which could be implemented instead, with subsequent removal of unwarranted signs.

Figure 4.6
Traffic Calmed Neighbourhood Sign

- **Traffic Calmed Neighbourhood signs** — illustrated in **Figure 4.6** — should be installed on all streets entering an area where traffic calming measures have been installed on an area-wide basis, and on streets where traffic calming measures have been installed on an isolated basis.

- **Turn prohibitions, through movement prohibitions and one-way signage** should only be used where it is not desirable to implement physical devices to obstruct these movements. Use of signage without accompanying obstructions can create an enforcement problem, and can be costly in terms of police resources.

5 TECHNICAL GUIDELINES

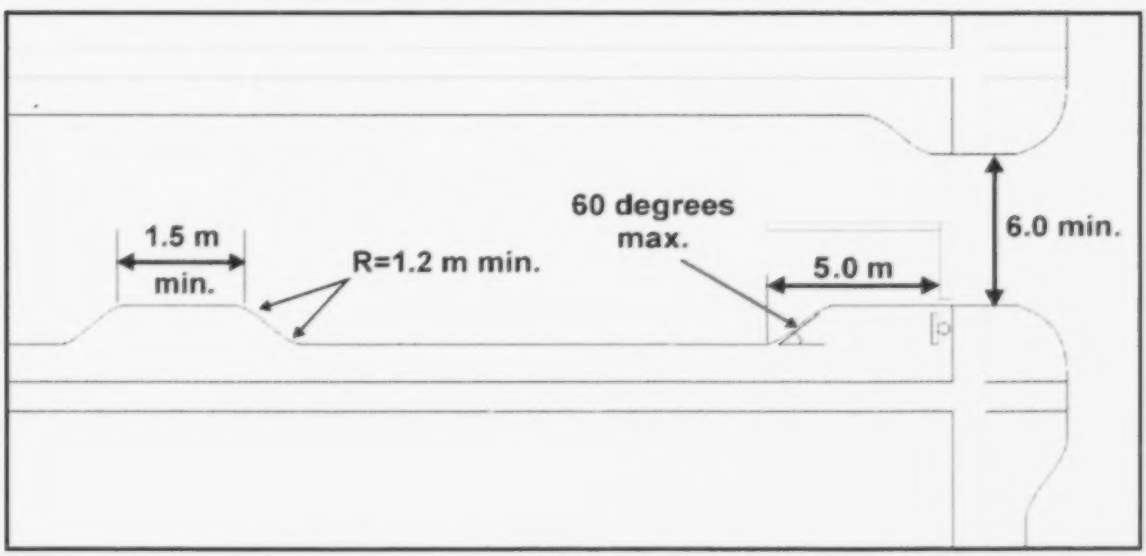
Chapter 4 of the *Canadian Guide to Neighbourhood Traffic Calming* (published by the Transportation Association of Canada and the Canadian Institute of Transportation Engineers in December 1998) contains guidelines regarding the design of various traffic calming devices. However, some of the design information contained in the Guide is incomplete or inappropriate. Improved design information is provided in this section to supplement or replace information contained in the Guide. As well, the Guide does not provide guidelines regarding construction techniques, and consequently that information is also included in this section.

5.1 DESIGN GUIDELINES

This section presents improved and modified designs for several traffic calming measures. These changes addresses deficiencies of the designs presented in the Guide, and reflect proven practices in other Canadian and U.S. communities.

- **Curb extensions.** The minimum dimensions indicated in the Guide for curb extensions (Section 4.3.2 of the Guide) are excessive, and might unnecessarily reduce opportunities for on-street parking. **Figure 5.1** indicates minimum dimensions appropriate for conditions in Calgary.

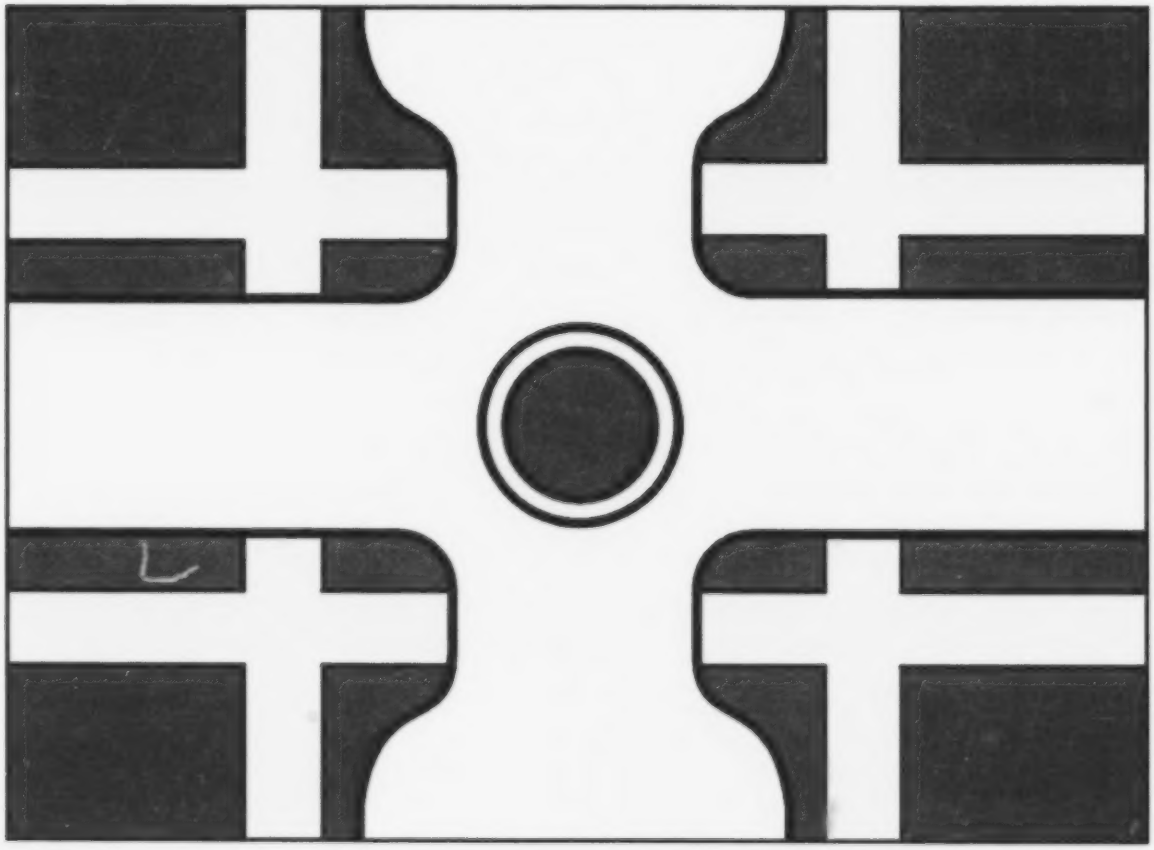
Figure 5.1
Minimum Dimensions For Curb Extensions



- **Curb extensions** should be constructed so as to maintain minimum 3.0 m distance from the curb extension to the roadway centreline on local streets and low-volume collector roads. On major roads and higher-volume collector roads, a 4.3 m distance should be provided from the curb extension to the lane line delineating the curb travel lane, so as to provide space for cyclists. A bicycle symbol can be marked on the pavement adjacent the curb extension to indicate that space has been provided for cyclists.

- **Curb extensions** can be used at intersections where one road is much wider than the other road, as illustrated in **Figure 5.2**. Curb extensions can also be used in combination with traffic circles at T-intersections to create adequate vehicle deflection around the circle, and at odd-shaped intersections so that the resulting traffic circle is close to circular in shape.

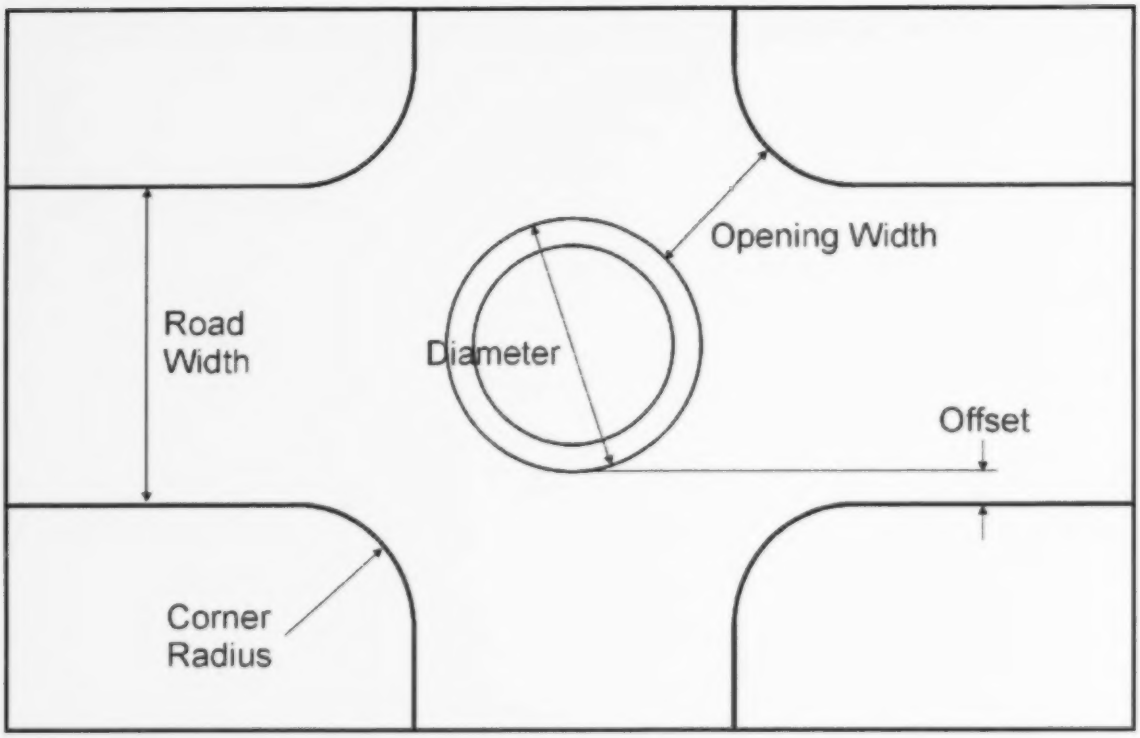
Figure 5.2
Curb Extensions with Traffic Circles



- **Traffic circles** should be designed to fit an existing intersection without modification to the intersection. Unless an intersection is square or nearly square, the resulting traffic circle will not be perfectly circular — it may be elliptical, egg-shaped or some other irregular shape, as illustrated in **Figure 5.3**. In designing a traffic circle, the most important dimension is the opening width, as illustrated in **Figure 5.4** This dimension should be between 5.0 m and 6.0 m, and ideally should be between 5.3 m and 5.5 m. The other important dimension is the offset — in order to create sufficient deflection in the path of a vehicle travelling around a traffic circle, the offset is reduced as the width of the intersecting street is increased.

Figure 5.3
Irregularly-Shaped Traffic Circle

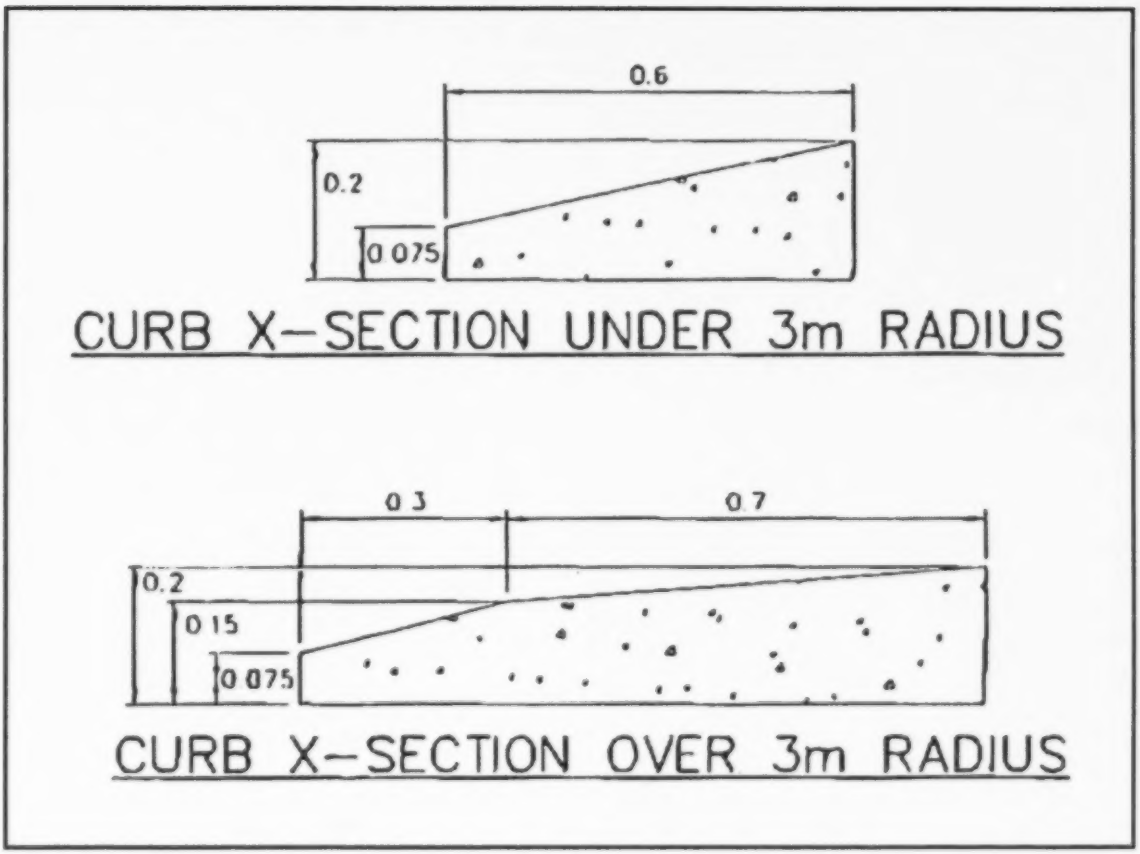
Figure 5.4
Traffic Circle Dimensions



- **Traffic circles** should incorporate a sloped apron which can be mounted by large vehicles if necessary to negotiate the circle. **Figure 5.5** illustrates designs of mountable aprons. The 0.6 m apron should be used with traffic circles which are 3.0 m or less in overall diameter. The top outside edge of the mountable apron should be rounded with a 25 mm radius.

- **Traffic circles.** Landscaping should be included in the centre of a traffic circle, rather than a hard surface or a planter. Asphalt should be removed from the centre of the traffic circle prior to landscaping. A minimum of 150 mm of pavement should be retained along the inside edge of the traffic circle curb, so as to provide stability for the concrete curb. Trees may be placed within the centre of traffic circles. Circles less than 5 m in diameter should include one tree placed in the centre of the circle. Circles larger than 5 m in diameter can incorporate up to three trees, each of which is located at least 1.25 m back from the inside curb face of the circle.

Figure 5.5
Mountable Aprons for Traffic Circles



- **Raised median islands.** The minimum dimensions indicated in the Guide for raised median islands and raised median islands through intersections (Sections 4.3.5 and 4.4.5 of the Guide, respectively) are excessive, and might unduly impact traffic operations and on-street parking on some streets. **Figures 5.6 and 5.7** indicate minimum dimensions appropriate for conditions in Calgary. It should be noted that median islands can be extended into the crosswalk area provided that this would not obstruct left turns to and from the side street. It should also be noted that raised median islands through intersections restrict access across the major roadway to pedestrians and cyclists only.

Figure 5.6
Minimum Dimensions For Raised Median Islands

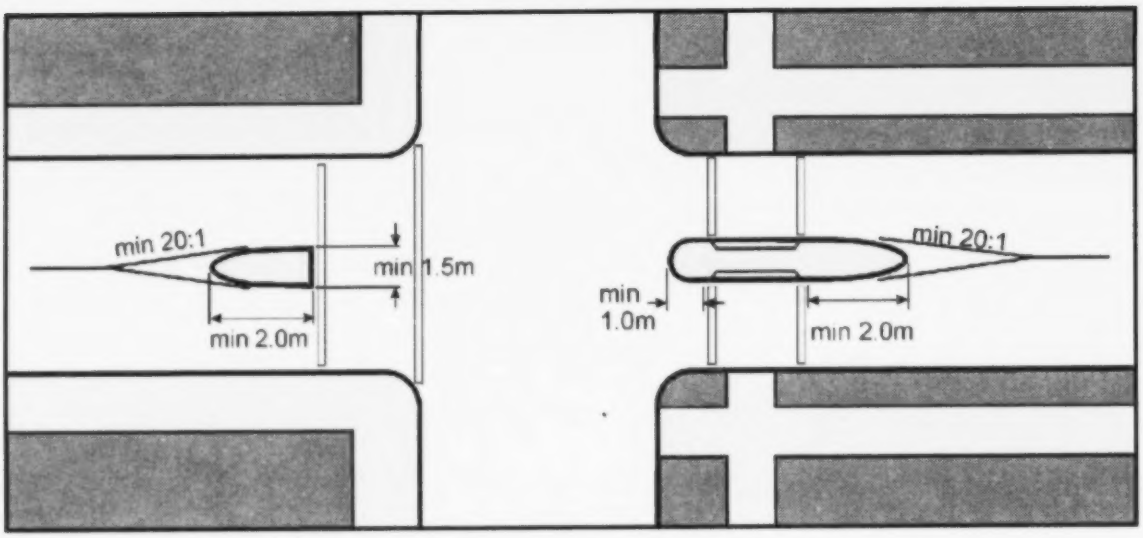
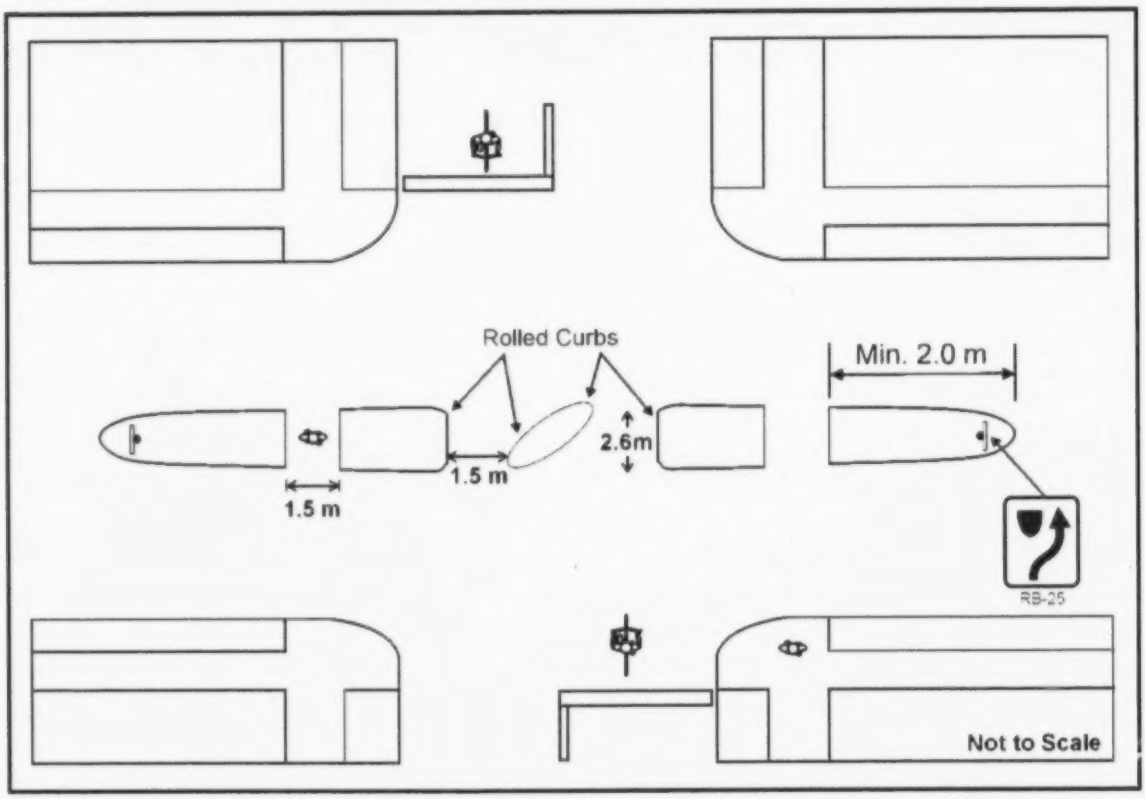


Figure 5.7
Dimensions for Raised Median Islands Through Intersections



- **Directional closure.** The designs for directional closures illustrated in the Guide (Section 4.4.1) can cause problems for cyclists where vehicles are parked against the back side of the closure, and can increase maintenance efforts as a result of debris accumulated in the bicycle channel. An alternative design of directional closure was developed in Vancouver to address these problems, as illustrated in **Figures 5.8 and 5.9**, and is recommended for use in Calgary.

Figure 5.8
Directional Closures

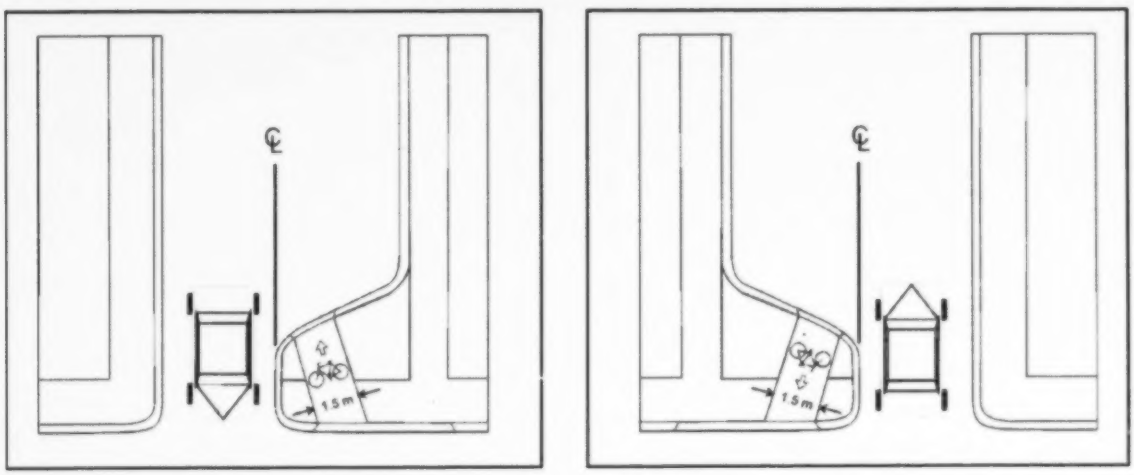
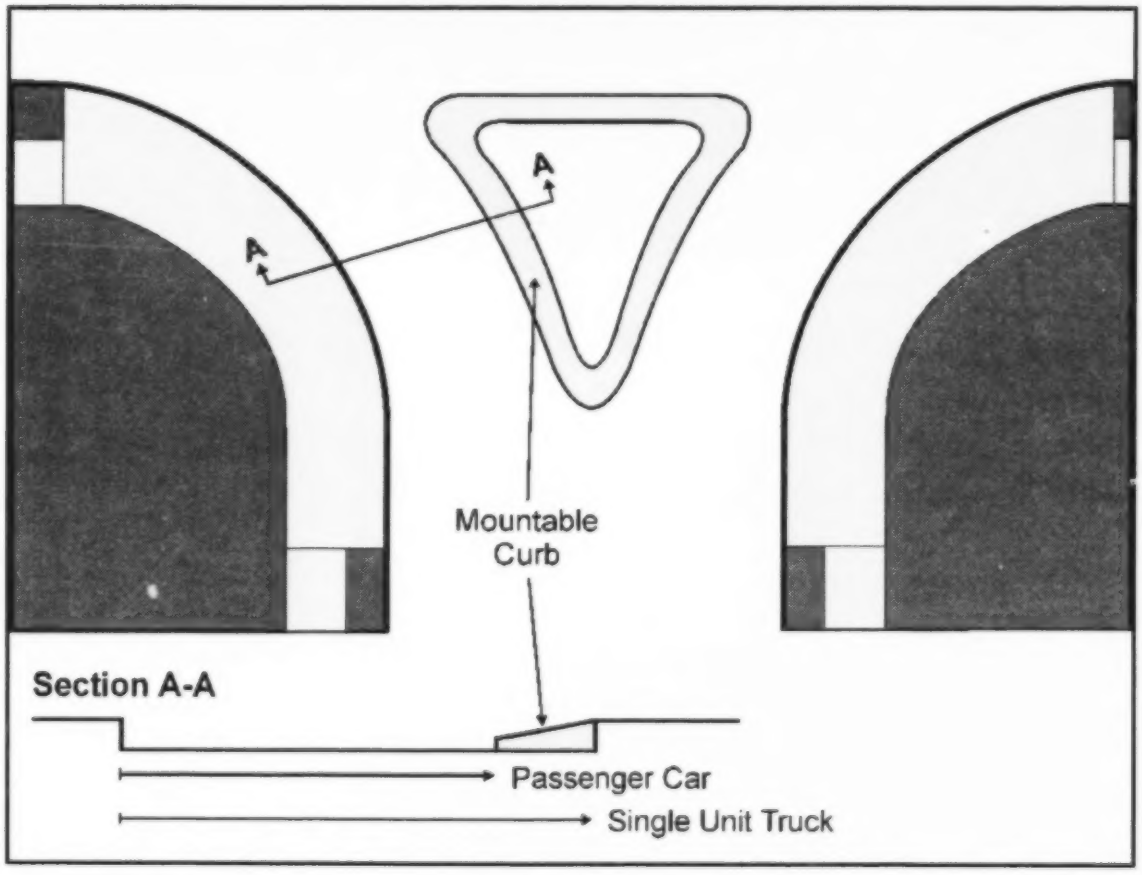


Figure 5.9
Exit-Only Directional Closure with Bicycle Access

- **Right-in, right-out island.** The design of a right-in/right-out island should be based on two design vehicles — a passenger car and a SU-9 single-unit truck — where an alternative route is available for larger vehicles. As illustrated in **Figure 5.10**, the width of the roadway through the device should only be sufficient to accommodate the design passenger car. A sloping concrete apron (similar to that used on traffic circles) should be incorporated at a width sufficient to accommodate the design truck. This approach to the design of right-in/right-out islands helps to discourage motorists in passenger cars from attempting to circumvent the device by turning left or travelling straight through the intersection. If the width of the roadway through a right-in/right-out island is constructed so as to accommodate a single-unit truck, it is very easy for a motorist in a passenger car — particularly a compact car — to circumvent the device. This reduces the effectiveness of the device and creates an enforcement problem.

Figure 5.10
Right-In/Right-Out Island



5.2 SIGNAGE AND PAVEMENT MARKINGS

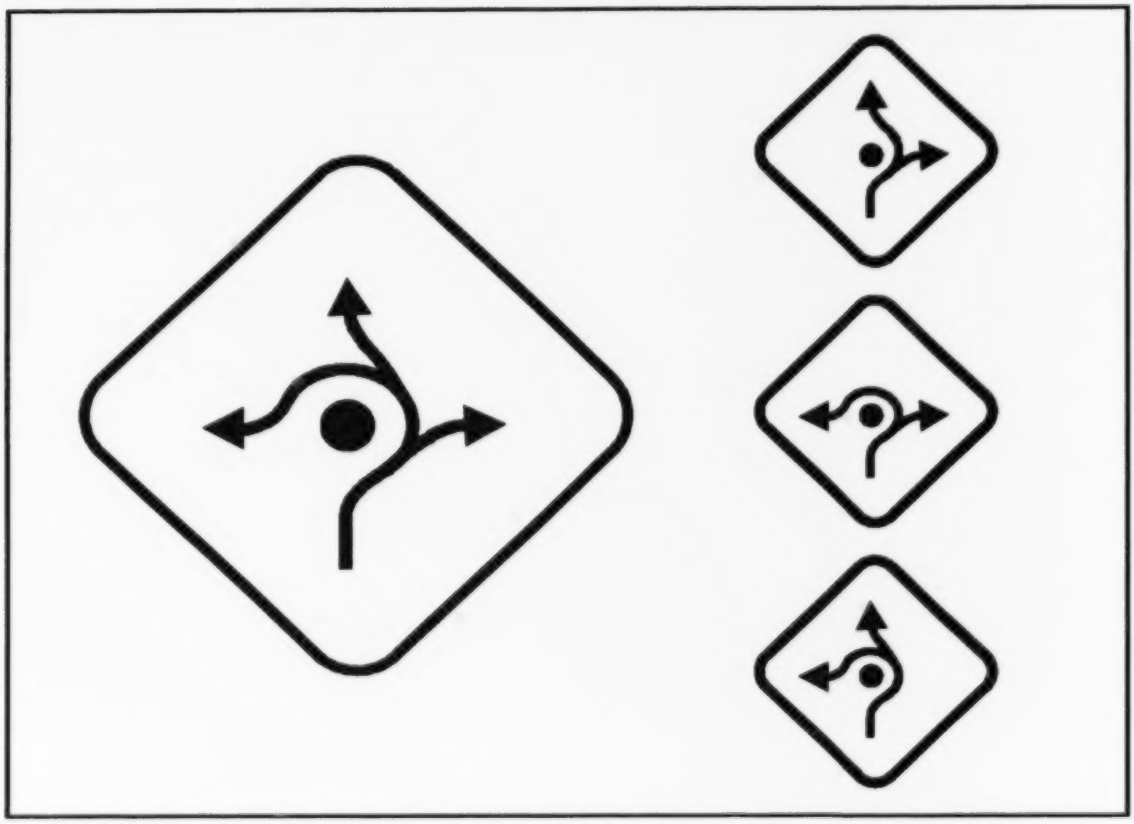
This section describes additional or modified signage for traffic calming devices, to supplement information contained in the Guide.

- **Speed hump signage.** On streets where a succession of speed humps have been installed, residents have sometimes complained of "visual pollution" from the signs located at each hump. An alternative approach used in many other municipalities in North America is to sign the entrances to each section of roadway (after each intersection) rather than sign every speed hump. When used in this manner, Speed Hump signs (WA-50) should be 750 mm x 750 mm for consistency with other warning signs, rather than the reduced size indicated in the Guide (which is used for Speed Hump signs located at each speed hump). Each sign should be installed with a tab identifying the length of roadway on which speed humps and other vertical deflections are used. This approach would not create a liability concern provided that pavement markings on the speed humps are maintained so that the humps are visible to motorists. On roads which are plowed during winter, the location of each hump should be marked with a bollard or other vertical object, for the benefit of the snow plow operator.

- **Object markers with curb extensions.** The Guide indicates that object markers (WA-36R) should be used with curb extensions. Although appropriate and necessary on major and collector roads, the use of object markers is optional on local streets. Residents often consider object markers to be "visual pollution," and consequently their use on local streets should be minimized or avoided altogether.

- **Traffic circle signage.** Yield signs should not be used with traffic circles. This will ensure consistency with traffic circle installations in Vancouver, Burnaby, New Westminster and other British Columbia municipalities, as well as west coast U.S. cities such as Seattle and Portland. Traffic circles should be identified in advance with a "Traffic Circle" warning sign, as illustrated in **Figure 5.11.** This sign not only alerts motorists and other road users to the presence of a traffic circle, but also illustrates how persons should travel through the intersection. If desired, the Traffic Circle sign can be modified as shown in **Figure 5.11** for installations at three-way intersections.

Figure 5.11
Traffic Circle Sign
(with modifications for three-way intersections)



5.3 CONSTRUCTION

The Guide does not provide information regarding construction techniques or the use of temporary measures. Consequently, key guidelines are provided in this section.

To avoid deterioration and fracturing, the edges of speed humps should be keyed into the roadway surface approximately 25 mm, as illustrated in **Figure 5.12.** To achieve the desired profile, speed humps and raised crosswalks should be shaped with a template which is passed across the hump, as illustrated in **Figure 5.13**.

Figure 5.12
Road Surface Ground To Key Edges of Speed Hump

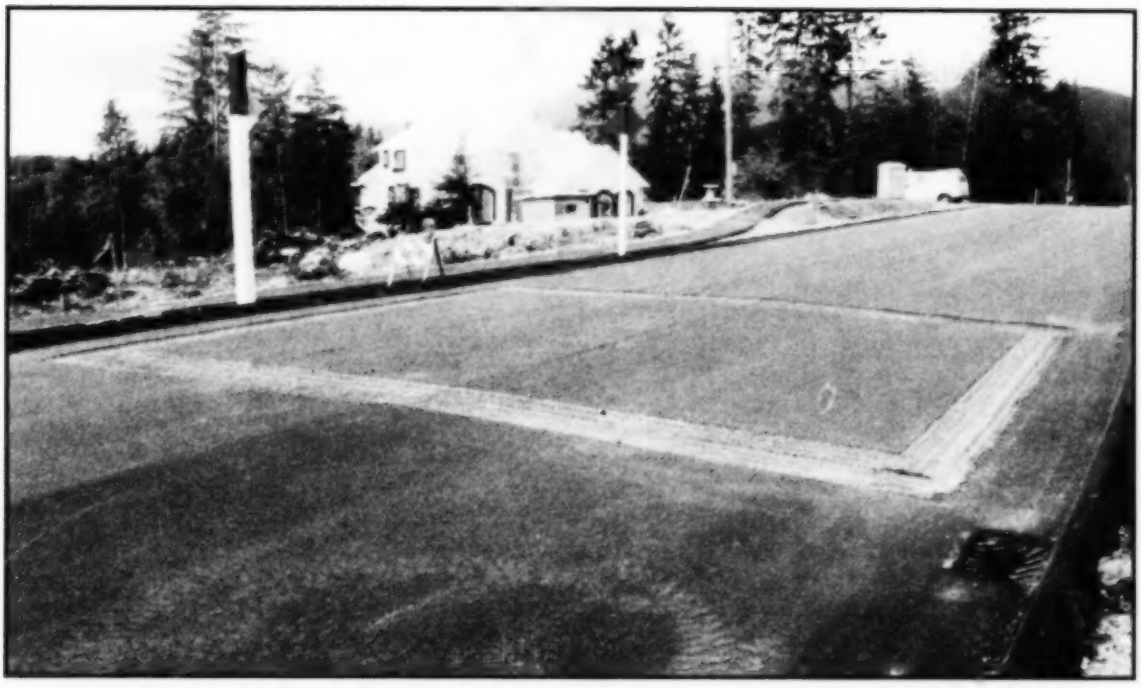
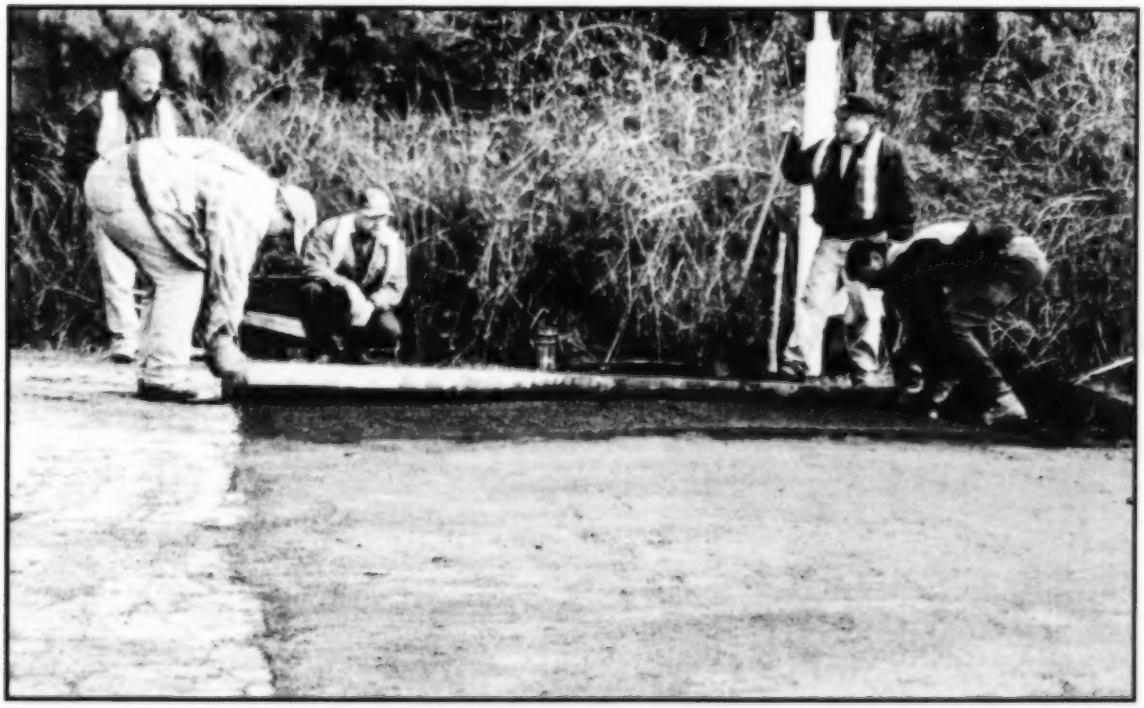


Figure 5.13
Shaping a Speed Hump With a Template



- **Traffic circles** can be pinned to the roadway, or can be constructed by pouring concrete on top of the roadway without pinning the circle. The latter approach is used in Vancouver, where frost heaving is generally not a concern. For winter conditions in Calgary, it is advisable to pin traffic circles to the roadway, as illustrated in **Figure 5.14**.

Where possible, traffic calming devices should initially be constructed on a temporary basis. For a period of at six to twelve months, including a winter season, the performance of the device should be monitored to ensure that the desired effects are achieved. Once the device has proven successful, it can be constructed on a permanent basis. This avoids the risk of removing or modifying a permanent installation that was constructed at a much higher cost than a temporary installation. If changes to the configuration of the device are necessary, these can be incorporated prior to permanent construction.

Figure 5.14
Traffic Circle Curb Construction

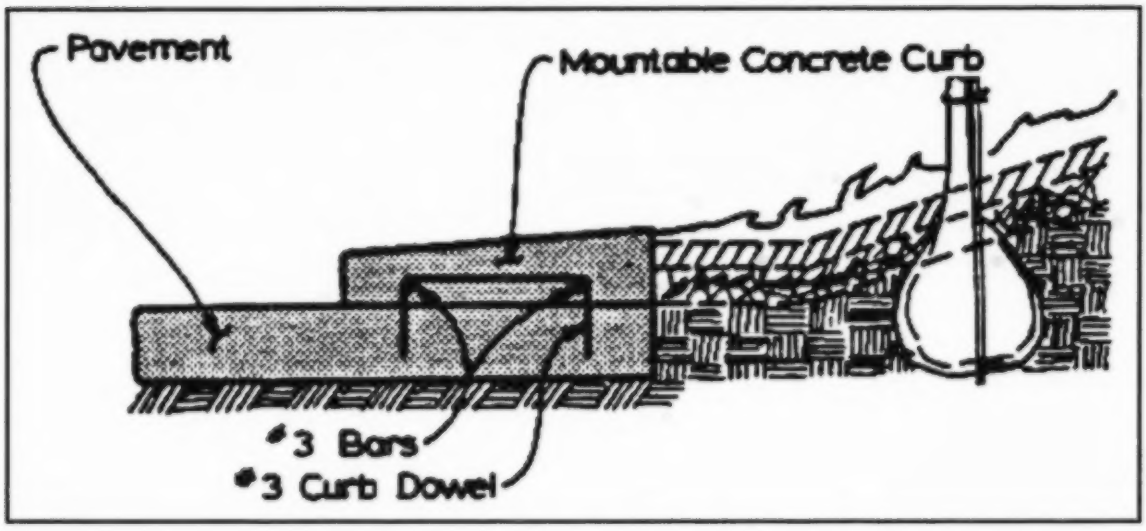


Figure 5.15 illustrates a potential temporary installation using flexible rubber curbing. Other construction techniques for temporary installations include concrete curbing formed on-site, pre-cast concrete curbing, and large heavy planters or other immovable objects. Selection of an appropriate construction technique depends on the location, type of traffic calming measure and available resources.

Speed humps and raised crosswalks cannot be constructed temporarily, and consequently should be constructed to a permanent standard. In some cases, it may be appropriate to construct some measure permanently at the outset — such as curb extensions — where there is no likelihood that they would be removed or modified at a later date.

Signs can be installed temporarily by placing the signpost in a bucket, filling the bucket with concrete, and then removing the hardened concrete and sign from the bucket. The resulting free-standing sign can be easily positioned where required, and can be later moved to another temporary installation.

Figure 5.15
Example Temporary Installation with Rubber Curbing
(for illustration purposes only)

GLOSSARY

Access	Access refers to modes of transportation which are permitted to enter or exit an area or pass a specific location (such as with an obstruction incorporating gaps to permit bicycle access), or specific movements which are permitted at an intersection (such as with an obstruction which permits right turn access only).
Barrier curb	A concrete curb in which the face of the curb is vertical. See *rolled curb.*
Channelization	Separation of vehicle movements at an intersection into defined paths through the use of physical roadway features and signs.
Chicane	A series of curb extensions on alternating sides of a roadway, which narrow the roadway and require drivers to steer from one side of the roadway to the other to travel through the chicane.
Collector road	A road for which vehicle movement and access are of equal importance. See *major road* and *local street.*
Community	A group of individuals with common interests. A community is often defined by neighbourhood boundaries, but may also include individuals who live outside neighbourhood, but who work or operate businesses in the neighbourhood, or whose children attend school in the neighbourhood. See *neighbourhood* and *stakeholder.*
Conflict	A collision or near-collision which requires evasive action on the part of one or more persons. Conflicts may occur between two motorists, between a motorist and cyclist, between a motorist and pedestrian, and between a cyclist and pedestrian, for example.
Corner radius reduction	Construction of an intersection corner using a smaller radius, typically less than 8 m.
Curb extension	A horizontal intrusion of the curb into the roadway, resulting in a narrower section of roadway.
Deflection	A vertical and/or horizontal change in the course or path of a vehicle as the result of a physical feature of a roadway. For example, a speed hump deflects the wheels, suspension and chassis of a vehicle in a vertical direction. A traffic circle requires that the vehicle be steered or deflected horizontally from its straight path to manoeuvre past the circle.

Device	A physical feature of the roadway, constructed for the purpose of affecting the movement of motor vehicles, bicycles and/or pedestrians. See *measure* and *regulation*.
Directional closure	A curb extension or vertical barrier extending to approximately the centreline of a roadway, effectively obstructing and preventing traffic movement in one direction.
Divert	To redirect traffic, typically through the use of physical obstructions in the roadway and/or regulatory signs.
Diverter	A raised barrier placed diagonally across an intersection, which forces traffic to turn and prevents traffic from proceeding straight through the intersection.
Drop curb	A section of a concrete curb in which the height of the vertical face has been reduced to allow passage while maintaining positive guidance and drainage control. Also referred to as curb cut.
Full closure	A barrier extending across the entire width of a roadway, which obstructs and prevents all motor vehicle traffic from continuing along the roadway.
Geometry	When referring to roadway design, geometry refers to the physical characteristics and dimensions of parts of the roadway.
Guideline	A recommended practice, method or value for a specific design feature, but not a requirement. See *standard*.
Intersection channelization	Raised islands located in an intersection, used to obstruct specific traffic movements and physically direct traffic through an intersection.
Jurisdiction	An agency or authority with responsibility and control for specific actions within a defined area.
Landscaping	Plants, shrubs, trees and other vegetation planted in a traffic calming measure or along a roadway, instead of grass or a hard surface.
Local street	A street for which the primary function is access to adjacent properties. Local streets are not intended to carry significant amounts of through traffic. See *major road* and *collector road*.
Major road	A roadway for which the primary function is to provide for vehicle movement. Typically, major roads are multi-lane roads. See *collector road* and *local street*.
Measure	A physical device, regulation or action which affects the

	movement of motor vehicles, bicycles and/or pedestrians. See *device* and *regulation*.
Median island	See *raised median island*.
Mode	A means of transportation. Examples of modes of transportation include automobile travel, transit, cycling and walking.
Neighbourhood	A cohesive urban area defined by geographic features, the street network or socio-economic characteristics. With respect to traffic calming, neighbourhood boundaries are often defined by the arterial street network and geographic barriers, which typically create a significant barrier to travel and interaction. See *community*.
On-street parking	The reduction of the roadway width available for vehicle movement by allowing motor vehicles to park within the roadway adjacent the curb.
Parking restriction	A limitation which prevents vehicles from being parked in specific locations, at specific times, or for specific types of vehicles. Most often used to control on-street parking.
Plan	A formulated and sufficiently detailed description of how an objective or number of objectives are to be accomplished. A traffic calming plan typically describes measures to be used, where they are to be located, in what order and at what times they will be implemented, and how the costs of the measures will be funded.
Raised crosswalk	A marked pedestrian crosswalk at an intersection or mid-block location constructed at a higher elevation than the adjacent roadway.
Raised intersection	An intersection — including crosswalks — constructed at a higher elevation than the adjacent roadways.
Raised median island	A raised island located on or near the centreline of a two-way roadway.
Raised median through intersection	A raised island located on or near the centreline of a two-way roadway, extending through an intersection, which prevents left turns and through movements to and from the intersecting roadway.
Regulation	A prescribed rule, supported by legislation. See *device* and *measure*.
Retrofit	The reconstruction of a roadway or other transportation facility with physical changes from the existing design.

Right-in/right-out island	A raised triangular island at an intersection which obstructs left turns and through movements to and from the intersecting street or driveway.
Rolled curb	A concrete curb in which the face is sloped or curved away from the vertical. See *barrier curb.*
Roundabout	Similar to a traffic circle. Roundabouts are typically used on major and collector roads, and are distinguished by Yield signs and raised median islands on all approaches, and in some cases, flare of the entry approach to two or more lanes. See *traffic circle.*
Rumble strips	Raised buttons, bars or grooves closely spaced at regular intervals on the roadway that create both noise and vibration in a moving vehicle.
Self-enforcing	A traffic calming measure which does not require police enforcement in order to be effective. A speed hump is self-enforcing, for example, whereas a posted maximum speed is not self-enforcing.
Short-cutting	Traffic which is travelling through a neighbourhood to bypass congestion on the arterial street network, or to make use of a more direct route. See *through traffic.*
Sidewalk extension	A sidewalk continued across a local street intersection, creating an appearance similar to a driveway.
Signalized	An intersection at which traffic signals have been installed, to control vehicle movements on all approaches, or to stop traffic so that pedestrians may cross.
Speed hump	A raised area of a roadway, which deflects both the wheels and chassis of a traversing vehicle.
Speed	The 85th percentile speed of all vehicles passing along a roadway during a specified time period is typically regarded as the representative speed of traffic. The 85th percentile speed is the speed exceeded by the fastest 15% of vehicles. When the 85th percentile speed exceeds the maximum legal vehicle speed, this is generally considered as indicating a speeding problem.
Stakeholder	An individual or organization with an interest in transportation issues in a neighbourhood or specific location. Examples of stakeholders include residents associations, a chamber of commerce, a local transit agency, cycling advocates, an agency assisting disabled persons, and school boards. See *community.*

Standard	A value for a specific design feature, which practice or theory has shown to be appropriate where the prevailing circumstances are normal, and where no unusual constraints influence the design. See *guideline*.
Streetscaping	A means of enhancing the street environment for all users of the right of way, and a means of modifying motorists behaviour, through the use of physical features which provide protection, coherence, security, convenience, community identify, way-finding and orientation, aesthetic quality and interest along an urban street.
Textured crosswalk	A crosswalk incorporating a textured and/or patterned surface which contrasts with the adjacent roadway.
Traffic calming	The combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users.
Turn prohibition	A regulation prohibiting a left turn or right turn at an intersection.
Volume	When referring to traffic, volume is a measure of the number of vehicles which travel along a section of roadway or make a particular movement during a specified time period. Most often, traffic volumes are indicated as vehicles per hour during the peak hour, or vehicles per 24-hour period.

APPENDIX

THE CITY OF CALGARY

Community Traffic Issue Reporting Form

Use this form to report a community traffic problem or safety issue to the City. Staff will follow up and determine whether traffic calming measures would be appropriate to address the problem, or whether another solution is required. If traffic calming is the appropriate solution, staff will prioritize the problem(s) you identify among all reported problems in the City. Community traffic studies are undertaken on a priority basis.

Location of problem(s). Be specific — indicate streets, intersections, addresses:

_____

_____

_____

Type of problems. Check all which apply:

- ☐ Pedestrian safety
- ☐ Other safety (cyclists, motorists)
- ☐ Parking
- ☐ Speeding vehicles
- ☐ Shortcutting traffic
- ☐ Other problems

Describe the problem(s). Be specific and provide as much information as possible. Indicate times of day, directions of travel, magnitude and extent of problems, and so forth:

_____

_____

_____

The personal information is being collected under the authority of the Freedom of Information & Protection of Privacy Act, Section 33(c). It will be used to communicate with the signatory as required. It is protected under the privacy provisions of the FOIP Act. If you have any questions regarding the collection of this personal information please contact the FOIP Program Administrator, Land Use & Mobility, Planning & Transportation Policy, P.O. Box 2100, Stn. "M", Calgary, AB T2P 2M5. Telephone 268-8045.

Your name: _____ Telephone: _____

E-mail: _____ Fax: _____

Agreement*

Community Association	Name of member of executive:	_____
	Position:	_____
	Signature:	_____
Alderman	Signature:	_____
Police	Signature:	_____

* Signature indicates agreement that community traffic issues need to be addressed

Thank you!

THE CITY OF CALGARY

Community Traffic Issue Reporting Form

We, the undersigned residents, do support the request to The City of Calgary to undertake a preliminary investigation into the identified traffic and/or safety issues *[on/in] [insert description of street(s), neighbourhood or area]*

Notes:

- Only one signature per household will be counted.
- A minimum level of support is required in accordance with the Traffic Calming Policy.
- An indication of support is also required from your community association, alderman and police representative.
- Community traffic studies are undertaken throughout the City in order of priority, based on an evaluation of safety and other issues. Once higher-priority plans have been implemented, plans for this *[street(s)/neighbourhood/area]* will be implemented.

The personal information is being collected under the authority of the Freedom of Information & Protection of Privacy Act, Section 33(c). It will be used to communicate with the signatory as required. It is protected under the privacy provisions of the FOIP Act. If you have any questions regarding the collection of this personal information please contact the FOIP Program Administrator, Land Use & Mobility, Planning & Transportation Policy, P.O. Box 2100, Stn. "M", Calgary, AB T2P 2M5. Telephone 268-8045.

Address	Signature	Address	Signature